The Federation of Fairfield and Colneis Calculation Policy February 2025

This document describes the expected progression in mathematical methods, and is designed to ensure consistency within our schools. The policy details the statutory objectives for addition, subtraction, multiplication and division from the National Curriculum 2013.

Mathematics at Fairfield and Colneis

This document has been produced to share with staff, governors, parents and any visitors to our schools who have an interest in how our pupils learn mathematics.
We firmly believe that, with the correct provision, **ALL** pupils can make progress, achieve and enjoy mathematics. The whole school 'Metacognition' approach, encourages resilience, independence and self-belief.
The National Curriculum 2013 states that:
'The expectation is that the majority of pupils will move through the programmes of study at broadly the same pace. However, decisions about when to progress should always be based on the security of pupils' understanding and their readiness to progress to the next stage.
Pupils who grasp concepts rapidly should be challenged through being offered rich and sophisticated problems before any acceleration through new content. Those who are not sufficiently fluent with earlier material should consolidate their understanding, including through additional practice, before moving on.'

We have high expectations and will provide appropriate challenge and support for all.
Using the National Curriculum objectives for each year group, the planning process identifies the small steps needed for **all** pupils to access the learning and achieve the objectives. Planning also considers the misunderstandings that may arise in some of the more complex concepts, and the support that may be needed for pupils that do not grasp it quickly. Similarly, for those who grasp the concept rapidly, planning includes challenging questions and learning tasks that require a deeper exploration. Pupils are expected to be able to prove their answers in more than one way, explore different possibilities, verbalise thinking methods and reason concisely, using precise mathematical language.

Planning, Provision and Whole Class Learning
Within a maths lesson you will see:

- Whole class discussion, partner talk (think, pair, share) to aid reasoning and conjecturing, 'Show-Me' boards exploring how answers were obtained, why the method/strategy worked and what was the most effective. This will aid formative assessment in order to direct the progression of the lesson.
- Age appropriate concrete and pictorial representations to deepen understanding of more abstract concepts.
- Written calculations taught through guided practice, allowing children to secure the method and apply it independently (I do, We do, You do).
- Practical problem solving and time for intelligent practice and consolidation, and opportunities to practise and apply the skill being taught in increasingly complex ways.
- Procedural variation – looking for similarities and differences, patterns and connections. This is used to highlight the key learning point.
- Effective questioning in order to recall prior knowledge, to assess understanding and to adapt as necessary (further support or further challenge).
- Precise mathematical language, using full sentences, is used by the teachers and modelled to the children.
- Live marking, so that misconceptions can be addressed quickly with individual children.

EYFS Reception

Addition and Subtraction

Mathematics Number ELG Children at the expected level of development will:

*Have a deep understanding of number to 10, including the composition of each number;

*Subitise (recognise quantities without counting) up to 5;

*Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts. **Numerical Patterns ELG Children at the expected level of development will:**

*Verbally count beyond 20, recognising the pattern of the counting system;

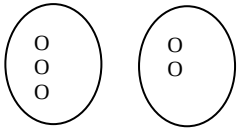
*Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;

Follow link for Development Matters objectives for children in Reception

https://assets.publishing.service.gov.uk/media/64e6002a20ae890014f26cbc/DfE_Development_Matters_Report_Sep2023.pdf

*Songs, rhymes and number games, practical resources in a variety of contexts are used to develop the key skills of counting objects including saying the numbers in order and matching one number name to each item.

*Number stories for combining two sets of objects: e.g. If there are 3 pigs in a field, and 2 in a sty how many are there altogether? Teacher models 3 + 2 = 5 with practical resources and drawings to encourage mark making in maths. Discuss the different ways children might record quantities (for example, scores in games), such as tallies, dots and using numeral cards.



*Developing spoken language including: add, subtract, more, less, altogether, count on, count back, total, one more, two more, how many more etc

*Numicon, dice, counters and ten frames are among a variety of resources used to subitise, add 2 numbers, subtract, share or count in groups of, as well as to understand number bonds for numbers up to 5.











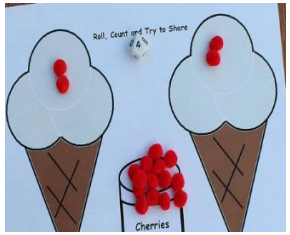
*Provide collections to compare, starting with a very different number of things. Include more small things and fewer large things, spread them out and bunch them up, to draw attention to the number not the size of things or the space they take up. Include groups where the number of items is the same.

*Use vocabulary: 'more than', 'less than', 'fewer', 'the same as', 'equal to'. Encourage children to use these words as well. Distribute items evenly, for example: "Put 3 in each bag," or give the same number of pieces of fruit to each child.











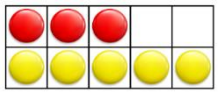
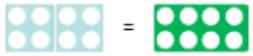
Year 1

Addition and Subtraction

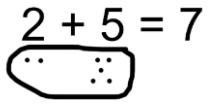
*Read, write and interpret mathematical statements involving addition (+), subtraction (-) and (=) signs.
*Represent and use number bonds within 20 and related subtraction facts within 20
*Add and subtract one-digit and two-digit numbers to 20, including zero
*Solve one-step problems that involve addition and subtraction using concrete objects and pictorial representations, and missing number problems such as 4 + □ = 7 or 8 - □ = 5

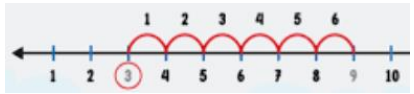
Addition

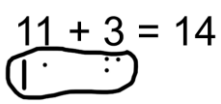
Songs and rhymes to learn counting forward and backwards, counting in 1s and to subitize numbers in preparation for number facts within 20.
Concrete resources including multi-link cubes, counters and ten frames and base 10 to visualise adding 1s then 10s and 1s within in 20.

The written method (2 + 5 = 7) is used alongside the concrete resources as well as the language add, digits, more than, count on, total, altogether. Children are taught to draw their own representations of 1s then 10s and 1s to solve their own addition problems, including zero.





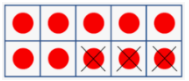


Number lines/number tracks are used to visualise the numbers increasing and getting bigger so an understanding of addition increasing the amount is understood.

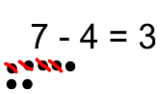
Subtraction

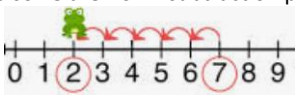
Songs and rhymes to learn counting forward and backwards, counting in 1s and to subitize numbers in preparation for number facts within 20.
Concrete resources including multi-link cubes, counters and ten frames and base 10 to physically subtract an amount then to visualise subtracting 1s then 10s and 1s within in 20 by crossing out.

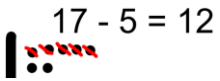
7 – 2 = 5 10 – 3 = 7 8 – 5 = 3


The written method is used alongside the concrete resources as well as the language subtract, take away, digits, less than, count back, total, what is left. Children are taught to draw their own representations of 1s then 10s and 1s to solve their own subtraction problems, including zero.







Number lines/number tracks are used to visualise the numbers decreasing and getting smaller so an understanding of subtraction decreasing the amount is understood.

Multiplication and Division

*Solve one-step problems involving multiplication and division by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.
*Make connections between arrays, number patterns, and counting in twos, fives and tens.

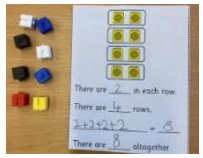
Multiplication

Counting songs and rhymes in 2s, 5s and 10s as well as doubles to make links with the 2 times table in Y2.
Use concrete resources such as cubes, counters and Numicon to learn to skip count and count in sets of a number. Use alongside number lines, 100 grids and interactive tools to spot patterns and rules. Introduce the language multiply, times, sets of, groups of, rows and total.





Teachers to introduce, model and facilitate the use of arrays as a method for counting in sets of a number, using practical resources.
Written methods include skip counting, repeated addition and the symbols for multiply and equals.

Division

Counting songs and rhymes in 2s, 5s and 10s as well as halves to make links with dividing by 2 in Y2.
Practical sharing and grouping using appropriate contexts for the children:
Sharing – 6 sweets are shared between 2 children. How many do they have each?

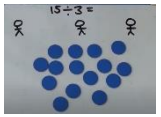
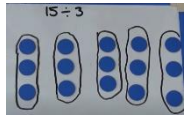


Grouping – There are 6 sweets. How many children can have 2 each? (How many 2s make 6?)



Introduce the language divide, sharing, grouping, equal and total.
Practical activities to include cutting cakes or a pizza in half and sharing counters/cubes between different amounts of children (links to fractions).

Written methods include the division symbol and equals symbol, modelled by the teacher. Organise groups into arrays so children begin to see the connection between multiplication and division.

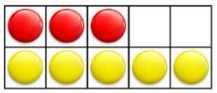
Year 2

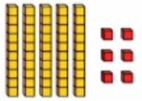
Addition and Subtraction

*Solve addition and subtraction using concrete objects and pictorial representations, including: a two-digit number and ones, a two-digit number and tens, two two-digit numbers, adding three one-digit numbers
*Recall and use addition facts to 20 fluently, and derive and use related facts up to 100
*Show that addition of two numbers can be done in any order (commutative)
*Use the inverse relationship between addition and subtraction to check calculations and solve missing number problems
*Start to record addition in columns

Addition

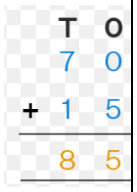
Using concrete resources and pictorial images to visualise the digits that change when adding 10s and/or 1s and the commutative law. Highlight the strategy of bridging to 10 (8 + 8 can be 8 + 2 = 10 + 6 = 16) as well as counting on from the tens to the ones (10, 20, 30, 40, 41, 42 …)





Use the written method (3+5 = 8, 4+4+8 =) alongside the resources/images and then move to representations of 10s and 1s that the children can use to solve problems (55+10=) as well as numberlines and 100 grids, so they can start to develop mental strategies (counting on in 1s and 10s) based on their knowledeg of number and place value.

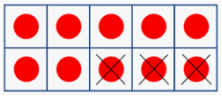


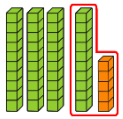



When these strategies are secure, move onto the introduction of the column method. Extend use of column addition, **denoting the name/value of the digit and column (H T O),** using base 10 materials to model, starting without exchanging.

Subtraction

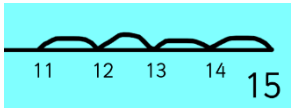
Using concrete resources and pictorial images to visualise the digits that change when subtracting 10s and/or 1s. Use practical resources to visualise physically subtracting amounts before moving onto pictorial representations that can be crossed out. Highlight links with number facts within 10 and 20 and the inverse relationship between addition and subtraction.





Use the written method (10 -3 = 7 and 7 + 3 = 10, 8 – 5 = 3 so 80 – 50 = 30) alongside the resources/images, then move to representations of 10s and 1s that the children can use to solve subtraction problems that do not cross the 10s barrier. Once they have secured these methods, introduce counting back on a number line and 100 grids in both 1s and 10s. Subtract the 1s first as this is how they will use the column method in Y3.





Introduce subtraction on an ENL, starting with 1s then 10s, then 2-digit numbers.

Multiplication and Division

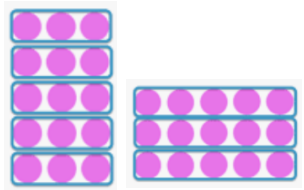
Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
Calculate mathematical statements for division within the multiplication tables and write them using the division (÷) and equals (=) signs
Show that multiplication of two numbers can be done in any order (commutative) and show that division of one number by another cannot be done in any order
Solve problems involving multiplication and division using materials, arrays, repeated addition, mental methods and multiplication and division facts and including problems in contexts.

Multiplication

Counting songs and rhymes in 2s, 5s and 10s forwards and backwards
Using concrete resources and pictorial images (see Y1) to visualise the digits changing in jumps of 2, 5 or 10 and highlighting patterns such as even numbers, doubles, 5 or 0 and multiples of 10 which the children will have learnt when adding 10s.
Teach multiplication as counting in groups of or sets of, repeated addition, then as a multiplication sentence using the symbols - multiplication (×) and equals (=). 5+5+5 = 3 sets of 5 3 x 5 =

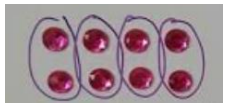


The children will learn to draw their own arrays, counting in 2s, 5s or 10s and recording the total at the end of each row or set. They will be taught that multiplication can be completed in any order 3 x 5 = 15 or 5 x 3 = 15. Commutative Law

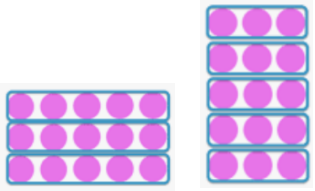


Division

Counting songs and rhymes in 2s, 5s and 10s forwards and backwards
Using concrete resources and pictorial images to divide/share the whole amount into equal groups, using sharing circles and making groups of, highlighting that each method gives the same answer but cannot be completed in any order, as multiplication can. 8 ÷ 2 = 4 (sharing circles and groups of 2)

The children will learn to draw their own arrays and to count in sets of a number to divide. 15 ÷ 5 = 3 (sharing into 5 equal groups) and 15 ÷ 5 = 3 (making equal groups of 5)
They will be taught to make links with their multiplication facts (3 x 5 = 15 so 15 ÷ 5 = 3) and halving (2 times tables).



Year 3

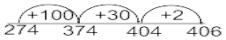
Addition and Subtraction

* Add and subtract numbers mentally, including:
  * a three-digit number and 1s * a three-digit number and 10s * a three-digit number and 100s

* Add and subtract numbers with up to 3 digits, using formal written methods of columnar addition and subtraction
* Estimate the answer to a calculation and use inverse operations to check answers
* Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Addition

Use partitioning to support mental calculations up to 3-digit numbers and use understanding of Place Value to estimate and check answers.
Use an empty number line to count on to cross the 10 and 100 boundaries: 274 + 132



Extend use of column addition, **denoting the name/value of the digit and column (H T O),** using base 10 materials to model, starting without exchanging, then introduce exchange in one column at a time.

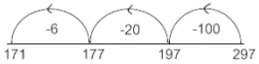
374	374	374
123 +	18 +	351 +
497	392	725
	1	1

Use their understanding of fact families to calculate the inverse and solve missing number problems.

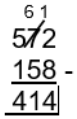
7 + 9 = 16
9 + 7 = 16
16 – 7 = 9
16 - 9 = 7

Subtraction

Use partitioning to support mental calculations up to 3-digit numbers and use understanding of Place Value to estimate and check answers.
Develop confidence in counting back in 100s, 10s and 1s from any number.
Use an empty number line to cross the 10 and 100 boundaries.
297 – 126 =



Use base 10 materials to explain the method of exchanging. Start with calculations without exchanging, then introduce exchange with one column, before moving onto 2 or 3 columns.
572 - 158 =



Multiplication and Division

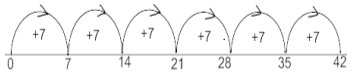
* Recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables
* Write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods
* Solve problems, including missing number problems, involving multiplication and division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects

Multiplication

Multiply 1- and 2-digit numbers by 10: 52 x 10 = 520



Know that division is inverse of multiplication.
Multiply multiples of 10 using known x tables: 60 x 3 = 180 (I know 6 x 3 = 18 so it will be ten times bigger).
Understand multiplication as repeated addition.



Use a number line to solve 6x7

Continue to use arrays and count in sets of a number.

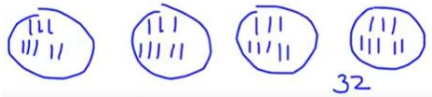
Progress towards the formal short multiplication method:

35
x 3
15
90
105

Division

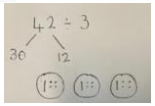
Understand division as grouping and as sharing. Be able to find ¼ or ½ of 24, 60, 200.
Make clear links between x and ÷ and find missing numbers using known multiplication facts: 45 ÷ □ = 5
Divide by 10 introducing one decimal place: 650 ÷ 10 = 65 72 ÷ 10 = 7.2
Divide using sharing circles: 15 ÷ 3 = 5 and remainders such as 35 ÷ 4 = 8 remainder 3



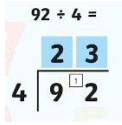




When dividing larger numbers where the dividend is more than 10 times the divisor e.g. 42÷ 3 =, use the divisor to partition the number accordingly.



Where appropriate, introduce the bus stop method for short division for calculaions requiring no remainders. EG:



Year 4

Addition and Subtraction

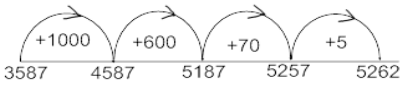
* Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate
* Estimate and use inverse operations to check answers to a calculation
* Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

Addition

Use knowledge of number facts and place value to support mental calculations.
Extend use of columnar addition to 4-digit numbers with exchanging in different columns, **denoting the name/value of the digit and column (H T O)** and using base 10 materials and place value counters to support.

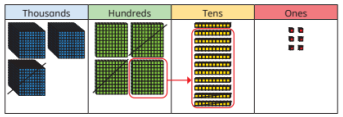
```
  1279
+ 2243
------
  3522
   11
```

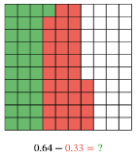
Using an empty number line to count on when solving problems involving time and measurement.

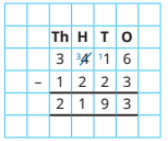


Subtraction

Use knowledge of number facts and place value to support mental calculations.
Use knowledge of place value, with 4-digit numbers and exchanging, leading to more concise recording.
Use base 10 materials and place value counters to support understanding of the value of each digit in its expanded form, 3000+400+10+6=3416

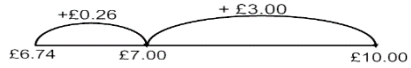






Begin to extend to decimals, to 2 decimal places.

Use an empty number line for counting on in order to solve word problems such as: How much change will I get from £10 if my shopping costs £6.74?



Multiplication and Division

* Recall multiplication and division facts for multiplication tables up to 12 × 12
* Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together 3 numbers
* Recognise and use factor pairs and commutativity in mental calculations
* Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
* Solve problems involving multiplying and adding, including using the distributive law to multiply two-digit numbers by 1 digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects

Multiplication

Multiply by using known facts. e.g. To multiply by 20, multiply by 10 then double.
Multiply up to 3-digit numbers by 10 or 100.
Extend use of multiplication facts and related facts to multiply by multiples of 10, 100 and 1000. EG: If 8 x 7 = 56, then 80 x 7 must equal 560.
Extend use of formal short multiplication:

342 × 7 becomes

```
   3  4  2
×        7
-----------
2  3  9  4
   2  1
```

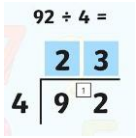
Use methods within problem solving contexts such as money and measures. Eg apply scaling to problems such as recipes and ingredients.
4 children drink 59ml of juice each. How much do they drink altogether? 4 x 59 =
59 is 1 less than 60 so 4 x 60 = 240 – 4 = 236

Division

Continue to understand division as both sharing and grouping.
35 ÷ 4 = 8 remainder 3



Use informal methods relating to the child's mental methods and within known multiplication tables, including those with remainders: 50 ÷ 6 = 8 r2 (I know that 6 x 8 = 48, so there must be 2 left over)
Introduce the bus stop method for short division for calculaions requiring no remainders. EG:



Divide a 1 or 2 digit number by 10 and 100, using the plave value chart:
4 ÷ 100 = 0.04 27 ÷ 100 = 0.27

Year 5

Addition and Subtraction

* Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction)
* Add and subtract numbers mentally with increasingly large numbers
* Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
* Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Addition

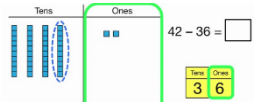
Use knowledge of partitioning, near doubles, counting up and +/- 10 to support mental calculations, deciding on which is the most efficient method to use. Continue to use columnar addition for numbers with more than 4 digits, including decimals, denoting the name/value of the digit and column (Th H T O), when appropriate, including exchanging.

421271	42.432
512243 +	12.713 +
933514	55.145
1	1

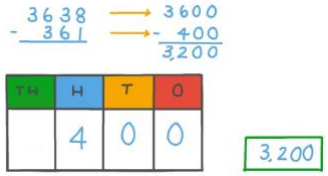
Subtraction

Use partitioning, near doubles, counting up and +/- 10 and adjust to support mental calculations. Use formal written columnar subtraction including for decimals. Where required, use base 10 and place value counters to represent exchanging.

2 1
~~3~~6.57
17.46 –
19.11



Use rounding to estimate and check subtraction answers.



Multiplication and Division

* Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
* 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
* Multiply and divide numbers mentally drawing upon known facts, including multiplying whole numbers and those involving decimals by 10, 100 and 1000.
* 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
* Recognise and use square numbers and cube numbers, and the notation for squared (^{2}) and cubed (^{3})
* Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes

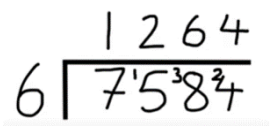
Multiplication

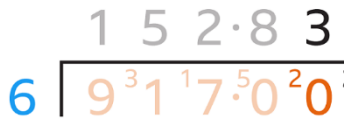
Use formal long multiplication for up to 4 digits x 2 digits. Eg 1354 x 24

1 3 5 4
2 4 x
5,4,1,6
2 7,0 8 0
3 2 4 9 6
1

Division

Use formal short division (bus stop) for dividing a 4-digit number by a 1-digit number., including those with a decimal answer.





Year 6

Addition and Subtraction

* Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
* Perform mental calculations, including with mixed operations and large numbers

Addition

Use partitioning, near doubles, counting up and +/- 10 and adjust to support mental calculations.
Continue to use columnar addition for numbers up to 1 million, **denoting the name/value of the digit and column (Th H T O), when appropriate,** including exchanging.

```
 2353248
 1254173 +
 3607421
   1  11
```

Subtraction

Use partitioning, near doubles, counting up and +/- 10 and adjust to support mental calculations.
Use a formal written method of columnar subtraction, including for decimals.

```
 2 1
 ~~3~~6.573
 18.462 –
 18.111
```

Multiplication and Division

* Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication
* 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
* Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context
* Perform mental calculations, including with mixed operations and large numbers

Multiplication

Use formal long multiplication for up to 4 digits x 2 digits. Eg 1354 x 24

```
  1 3 5 4
    2 4  x
  5,4,1,6
2 7,0 8 0
3 2 4 9 6
1
```

Division

Use formal long and short division methods with larger numbers.

```
      2 1 2. 2 9
2 4 ) 5 0 9 5. 0 0
    4 8 |
      2 9
      2 4
        5 5
        4 8
          7 0
          4 8
            2 2 0
            2 1 6
```

```
      2 1 2. 2 9
2 4 ) 5 0 2 9 5. 7 2 0
```

```
      2 1 2 r 7
2 4 ) 5 0 2 9 5
```