



**Acorn
Multi Academy
Trust**

Acorn Multi Academy Trust **Calculation Policy 2023-24**

| | |
|-----------------------------|-------------------|
| Year 1..... | 2 |
| Year 2..... | 3 |
| Year 3..... | 4 |
| Year 4..... | 5 |
| Year 5..... | 6 |
| Year 6..... | 8 |

Introduction:

This document is intended to support the schools that use White Rose in conjunction with their mathematics teaching. The representations and methods shown below are taken from the White Rose calculation policy. In order to make this document easier to read, some representations that are used less often have been omitted. If there are multiple representations or strategies of calculation for an objective, the recommended method by the end of that academic year is outlined with a red oval.

If you have any questions about this document, please contact your maths lead or head of school.

This document shall be reviewed every year and amendments shall be documented below.

Year 1

Addition

add and subtract one-digit and two-digit numbers to 20, including zero

Using practical resources and representations e.g. part-whole models, number lines, etc.



$$8 + 7 = 15$$

$$2 \quad 5$$

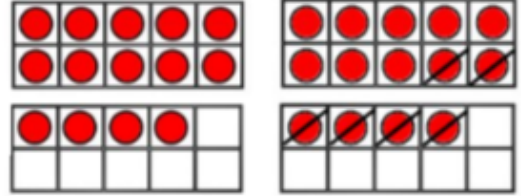
$$+ 2 \quad + 5$$



Subtraction

add and subtract one-digit and two-digit numbers to 20, including zero

Using practical resources and representations e.g. tens frames, number lines, etc.



$$14 - 6 = 8$$

$$- 2 \quad - 4$$

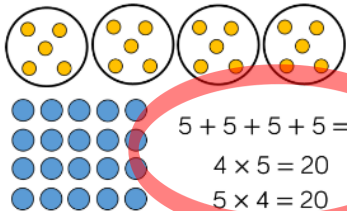
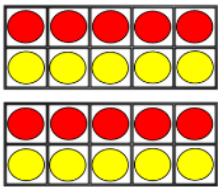


Multiplication

Solve 1-step problems using multiplication

Represent multiplication as repeated addition in different ways.

One bag holds 5 apples.
How many apples do 4 bags hold?



$$5 + 5 + 5 + 5 = 20$$

$$4 \times 5 = 20$$

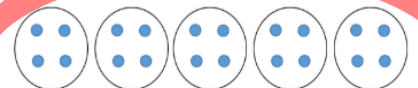
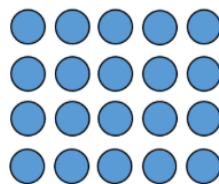
$$5 \times 4 = 20$$

Division

Solve 1-step problems using multiplication (sharing)

Solve problems by sharing amounts into equal groups. Children use concrete and pictorial representations to solve problems. They are not expected to record division formally.

There are 20 apples altogether.
They are shared equally between 5 bags.
How many apples are in each bag?



$$20 \div 5 = 4$$

Year 2

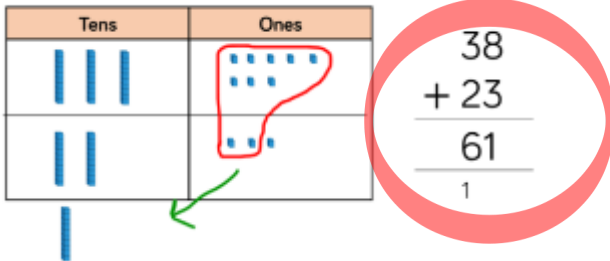
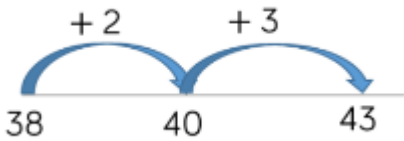
Addition

add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers

Using practical resources and representations e.g. base 10 (dienes) and place value grids, number lines, etc.

Building up to a formal written method for 2 digits.



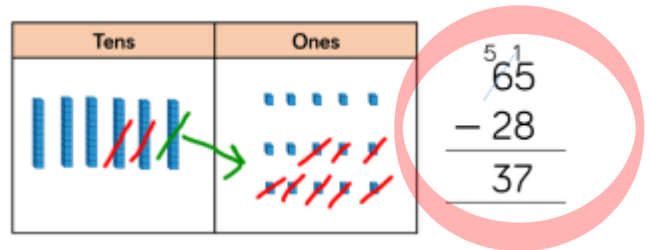
Subtraction

add and subtract numbers using concrete objects, pictorial representations, and mentally, including:

- a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers

Using practical resources and representations e.g. base 10 (dienes) and place value grids, number lines, etc.

Building up to a formal written method for 2 digits.

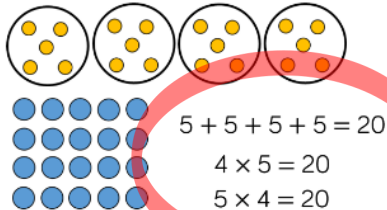
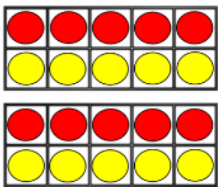


Multiplication

Solve 1-step problems using multiplication

Represent multiplication as repeated addition in different ways.

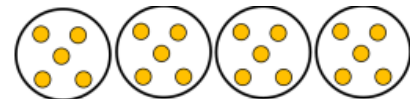
One bag holds 5 apples.
How many apples do 4 bags hold?



Division

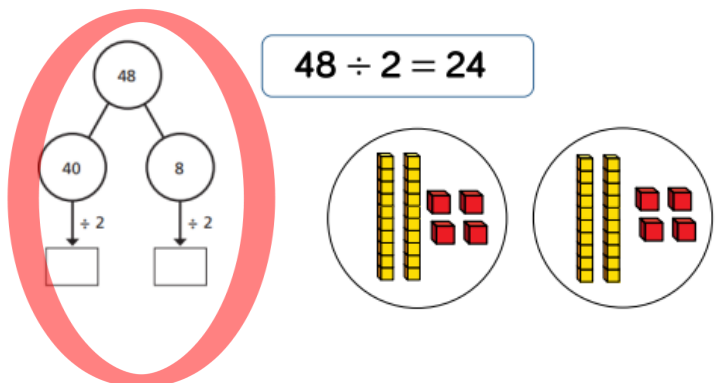
Solve 1-step problems using division (grouping)

There are 20 apples altogether.
They are put in bags of 5.
How many bags are there?



$$20 \div 5 = 4$$

Dividing Divide 2-digits with 1-digit (sharing with no exchange)

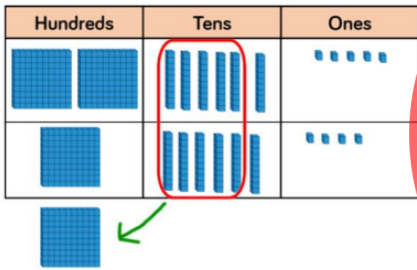
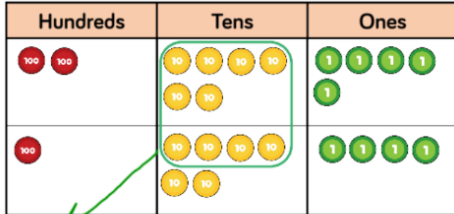


Year 3

Addition

Add numbers with up to 3 digits.

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.

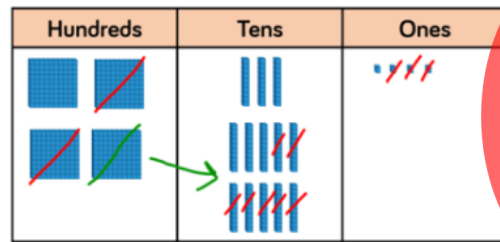
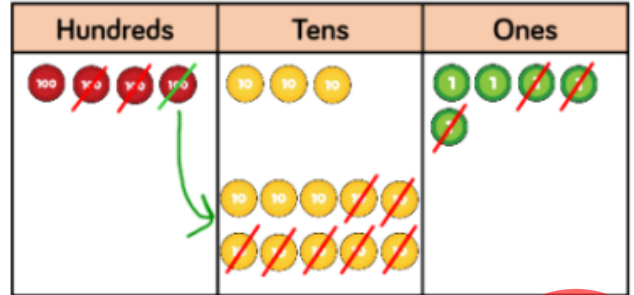


$$\begin{array}{r} 265 \\ + 164 \\ \hline 429 \\ 1 \end{array}$$

Subtraction

Subtract numbers with up to 3 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.



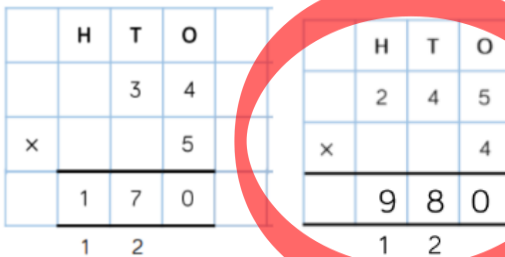
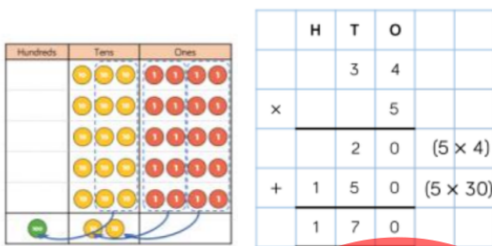
$$\begin{array}{r} 435 \\ - 273 \\ \hline 262 \end{array}$$

Multiplication

Multiply 2-digit numbers by 1-digit numbers

Teachers may decide to first look at the expanded column method before moving onto the short multiplication method. Practical resources and representation are used to support the understanding of the method, not as a way of calculating.

$$34 \times 5 = 170$$



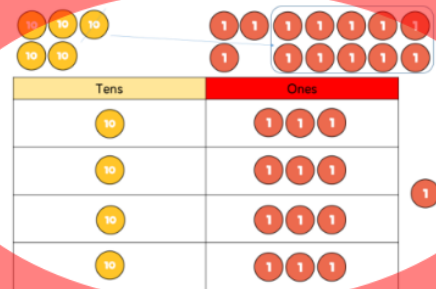
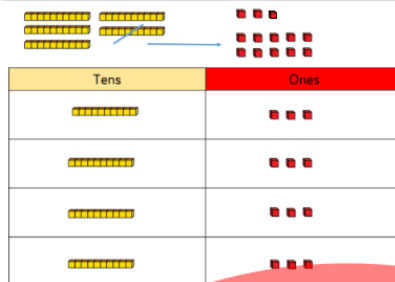
Multiply 3-digit numbers by 1-digit numbers

Move towards the short multiplication method as the numbers get larger, ie. into 3-digits x 1-digit

Division

Divide 2-digits by 1-digit (sharing)

$$53 \div 4 = 13 \text{ r}1$$

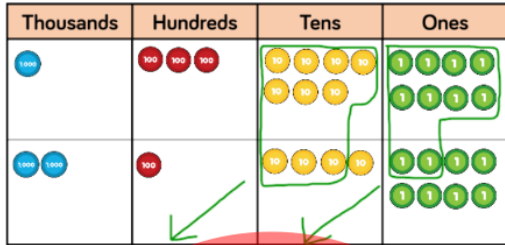


Year 4

Addition

Add numbers up to 4 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.

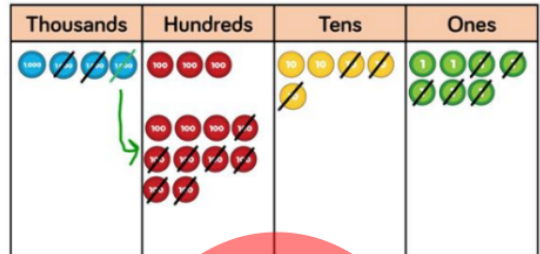


$$\begin{array}{r}
 1378 \\
 + 2148 \\
 \hline
 3526 \\
 11
 \end{array}$$

Subtraction

Subtract numbers with up to 4 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.



$$\begin{array}{r}
 31 \\
 4357 \\
 - 2735 \\
 \hline
 1622
 \end{array}$$

Multiplication

Multiply 3-digit numbers by 1-digit numbers

Move towards the short multiplication method as the numbers get larger, ie. into 3-digits x 1-digit

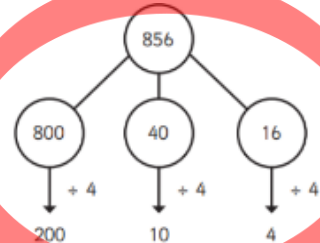
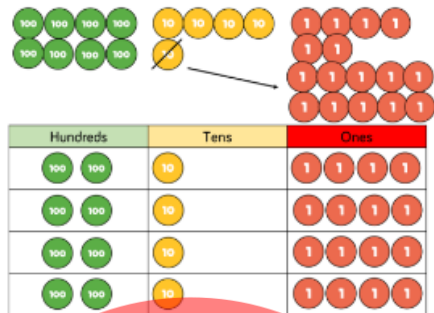
$$245 \times 4 = 980$$

| | H | T | O |
|---|---|---|---|
| | 2 | 4 | 5 |
| x | | | 4 |
| | 9 | 8 | 0 |
| | 1 | 2 | |

Division

Divide 2/3-digits by 1-digit

$$856 \div 4 = 214$$



>?

Year 5

Addition and Subtraction

Addition

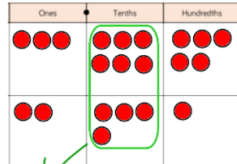
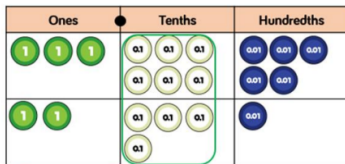
Add numbers with more than 4 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.

| | | | | | |
|-------|---|---|---|---|---|
| 1 | 0 | 4 | 3 | 2 | 8 |
| + | 6 | 1 | 7 | 3 | 1 |
| <hr/> | | | | | |
| 1 | 6 | 6 | 0 | 5 | 9 |

1

Add with up to 3 decimal places

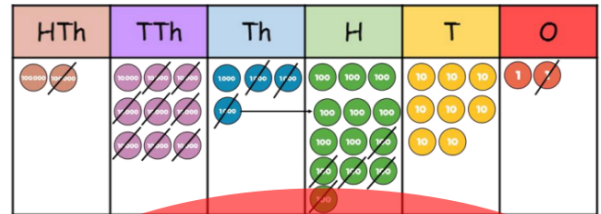


$$\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

Subtraction

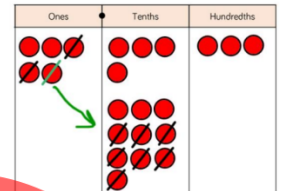
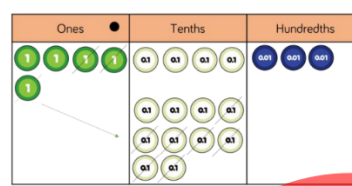
Subtract numbers with more than 4 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.



| | | | | | | |
|-------|---|---|--------------|----|---|---|
| | 2 | 9 | 3 | 13 | 8 | 2 |
| - | 1 | 8 | 2 | 5 | 0 | 1 |
| <hr/> | | | | | | |
| | 1 | 1 | 1 | 8 | 8 | 1 |

Subtract with up to 3 decimal places



$$\begin{array}{r} 4 \quad 1 \\ 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$$

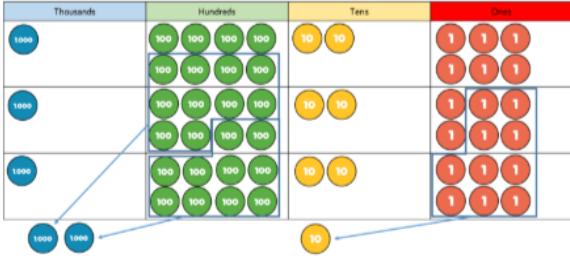
Year 5

Multiplication and Division

Multiplication

Multiply 4-digits numbers by 1-digit numbers

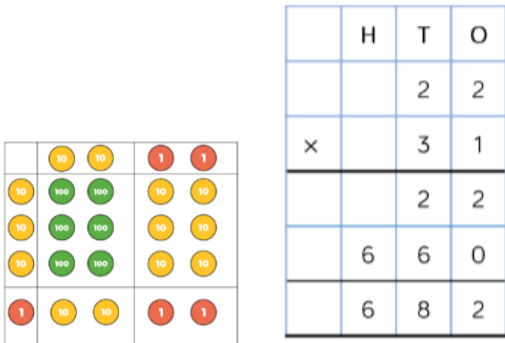
Place value counters are the best manipulatives to use when multiplying larger numbers. Again, these are just for aiding understanding, not to actually help the calculation. That must be done with the short multiplication method.



| | Th | H | T | O |
|---|----|---|---|---|
| | 1 | 8 | 2 | 6 |
| x | | | | 3 |
| | 5 | 4 | 7 | 8 |
| | 2 | | 1 | |

Multiply 2-digit numbers by 2-digit numbers

Use the formal written method to calculate. Other representations (such as an area model or PV counters) can be used to aid understanding.



Multiply 3-digits by 2-digits

| | Th | H | T | O |
|---|----|---|---|---|
| | | 2 | 3 | 4 |
| x | | | 3 | 2 |
| | | 4 | 6 | 8 |
| 1 | 7 | 1 | 0 | 2 |
| | 7 | 4 | 8 | 8 |

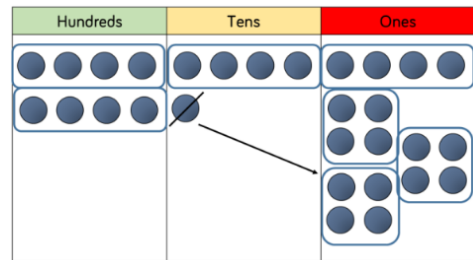
Division

Divide 3-digits by 1-digit

Children can continue to use grouping to support their understanding of short division when dividing a 3-digit number by a 1-digit number.

Place value counters or plain counters can be used on a place value grid to support this understanding. Children can also draw their own counters and group them through a more pictorial method.

$$856 \div 4 = 214$$



| | | | | |
|---|---|---|----|---|
| | | 2 | 1 | 4 |
| 4 | 8 | 5 | 16 | |

4-digits by 1-digit

| | | | | |
|---|---|---|----|----|
| | 4 | 2 | 6 | 6 |
| 2 | 8 | 5 | 13 | 12 |

Divide multi-digit by 2-digit (short division)

| | | | | |
|----|---|---|---|---|
| | | 0 | 3 | 6 |
| 12 | 4 | 4 | 3 | 7 |
| | | | 2 | |

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

| | | | | |
|----|---|---|----|----|
| | 0 | 4 | 8 | 9 |
| 15 | 7 | 7 | 13 | 13 |
| | | 3 | 3 | 5 |

| | | | | | | | | | |
|----|----|----|----|----|----|-----|-----|-----|-----|
| 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |
|----|----|----|----|----|----|-----|-----|-----|-----|

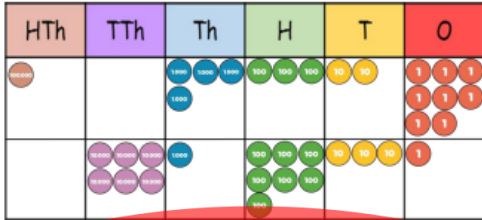
Year 6

Addition and Subtraction

Addition

Add numbers with more than 4 digits

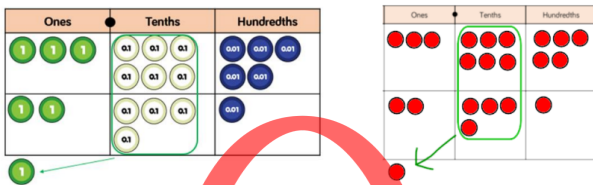
Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.



| | | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 0 | 4 | 3 | 2 | 8 |
| + | | 6 | 1 | 7 | 3 | 1 |
| | 1 | 6 | 6 | 0 | 5 | 9 |

1

Add with up to 3 decimal places

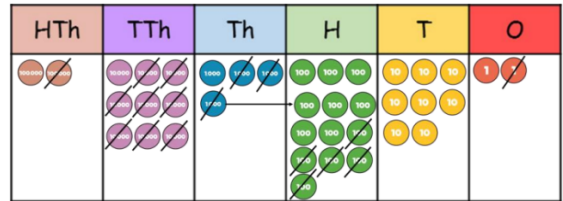


$$\begin{array}{r} 3.65 \\ + 2.41 \\ \hline 6.06 \\ \hline 1 \end{array}$$

Subtraction

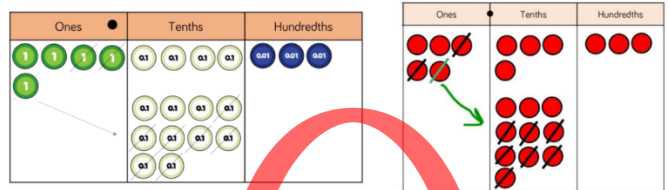
Subtract numbers with more than 4 digits

Using practical resources and representations to aid understanding of place value. Use the formal written method to calculate.



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

Subtract with up to 3 decimal places



$$\begin{array}{r} 5.43 \\ - 2.7 \\ \hline 2.73 \end{array}$$

Multiplication and Division

Multiplication

Multiply 4-digits by 2-digits

When multiplying 4-digits by 2-digits the children should be confident with the method. If they are struggling with times tables, providing multiplication grids to support this while focusing on the method.

$$2,739 \times 28 = 76,692$$

| | TTh | Th | H | T | O |
|-------|-----|----|---|---|---|
| | | 2 | 7 | 3 | 9 |
| × | | | | 2 | 8 |
| <hr/> | | | | | |
| 2 | 1 | 9 | 1 | 2 | |
| 2 | 5 | 3 | 7 | | |
| 1 | 5 | 4 | 7 | 8 | 0 |
| | 1 | | | | |
| 7 | 6 | 6 | 9 | 2 | |
| | | | | | 1 |

Division

Dividing multi-digits by 1 or 2 digits (short division)

Use of a number track to visually see the multiples of the divisor if the times table is unknown.

| | | | | |
|--|----|---|-----|-----|
| | | 0 | 3 | 6 |
| | 12 | 4 | 4 3 | 7 2 |

$$432 \div 12 = 36$$

$$7,335 \div 15 = 489$$

| | | | | | |
|----|--|---|-----|------|------|
| | | 0 | 4 | 8 | 9 |
| 15 | | 7 | 7 3 | 13 3 | 13 5 |

| | | | | | | | | | |
|----|----|----|----|----|----|-----|-----|-----|-----|
| 15 | 30 | 45 | 60 | 75 | 90 | 105 | 120 | 135 | 150 |
|----|----|----|----|----|----|-----|-----|-----|-----|

Dividing multi-digits by 2 digits (long division)

| | | | | | | |
|---|---|---|---|---|---|---|
| | | 0 | 3 | 6 | | |
| 1 | 2 | 4 | 3 | 2 | | |
| | | - | 3 | 6 | 0 | |
| | | | | 7 | 2 | |
| | | | | - | 7 | 2 |
| | | | | | | 0 |

- 12 × 1 = 12
- 12 × 2 = 24
- 12 × 3 = 36
- 12 × 4 = 48
- 12 × 5 = 60
- 12 × 6 = 72
- 12 × 7 = 84
- 12 × 8 = 96
- 12 × 9 = 108
- 12 × 10 = 120

$$432 \div 12 = 36$$

$$372 \div 15 = 24 \text{ r}12$$

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | 2 | 4 | r | 1 | 2 |
| 1 | 5 | 3 | 7 | 2 | | | |
| | | - | 3 | 0 | 0 | | |
| | | | | 7 | 2 | | |
| | | - | | 6 | 0 | | |
| | | | | 1 | 2 | | |

- 1 × 15 = 15
- 2 × 15 = 30
- 3 × 15 = 45
- 4 × 15 = 60
- 5 × 15 = 75
- 10 × 15 = 150