Written methods for division

Mauldeth Road Primary School

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Written methods for division of whole numbers

The aim is that children use mental methods when appropriate, but for calculations that they cannot do in their heads they use an efficient written method accurately and with confidence.

It is important that children practise and become confident in each method of calculation before moving on.

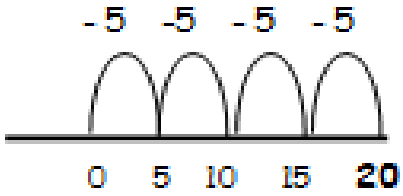
Practical division

- Begin by sharing out groups of objects such as 10 apples.
- Encourage your child to draw objects to help with division and then share the objects into smaller, equal groups.
- **Repeat with lots of examples until your child is confident with the concept of sharing.**

10 ÷ 2 = 5

Using an empty number line

- Move onto using an empty number line to demonstrate that, in fact division is the same as subtracting lots of the same amount (see example).
- Begin with the number you are dividing and keep subtracting groups of the number you are dividing by until it is no longer possible.
- **To find the answer count how many whole groups it was possible to subtract.**



20 ÷ 5 = 4

Chunking

- This method is based on subtracting multiples of the divisor from the number to be divided.
- Ask your child 'How many 9s are in 97?'
- We don't know immediately so lets use facts we already know. 'How many 9s are in 90?'
- Establish that it is 10 and record this at the side.
- Subtract 90 from 97 as this is how many you have already shared out.
- This leaves you with 7. 'How many 9s are in 7?' You can't get any so this becomes the remainder.
- Therefore the answer is 10 remainder 7 because you could get 10 lots of 9 from 97 and then there is 7 which can't be divided by 9.
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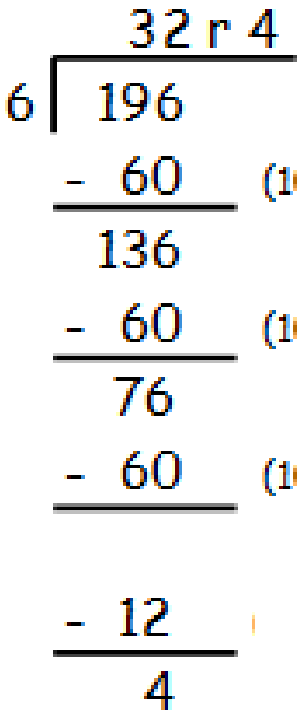
$97 \div 9 = 10 \text{ r } 7$

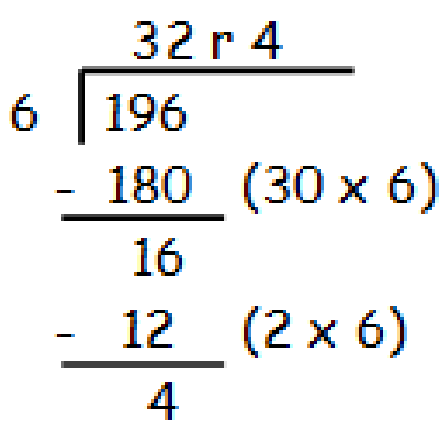
$$
\begin{array}{r}
10 \text{ r } 7 \\
9 \overline{)\ 97} \\
-\ 90 \quad (10 \times 9) \\
\hline
7
\end{array}
$$

$196 \div 6 = 32 \text{ r}4$

- Once they understand and can apply the method, children should be able to move on from a 2 digit number divided by a single digit number to a 3 digit number divided by a 2 digit number quite quickly as the principles are the same (see example).
- For larger numbers ask your child 'How many sixes are in 196?'
- Establish that 10 sixes are 60. Subtract the 10 lots of 6 which is 60 and record at the side.
- Repeat this until you can no longer subtract a multiple of 10.
- You now have 16 left to divide.
- Ask your child 'How many sixes are in 16?' Establish that 2 x 6 = 12.
- Subtract the 12 and again record the process at the side.
- You are now left with 4 which becomes the remainder.
- To find the final answer count up how many groups of 6 it was possible to get from the number. This should give an answer of 32 remainder 4.



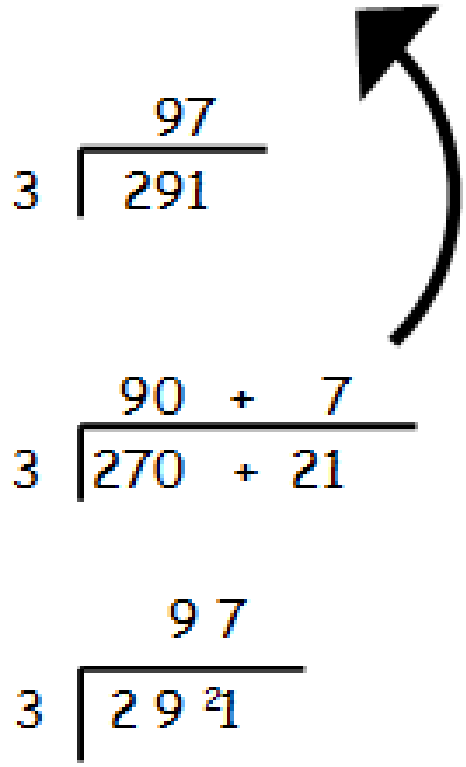
- Once your child is confident in this method encourage them to reduce the steps e.g. 'We know that there are 3 sixes in 18, so there must be 30 sixes in 180 as the number is ten times bigger'.
- Subtract 180 which leaves 16.
- 'How many sixes are in 16?' You can get 2 sixes with 4 left over.
- Count up how many 'lots of' six could be found in 196. You had 30 lots and another 2 so the answer is 32 with a remainder of 4.



Short division of HTU ÷ U

- 'Short' division of HTU ÷ U can be introduced as an alternative, more compact recording method.
- Ask your child 'How many threes in 291?' (the answer needs to be a multiple of 10). This gives 90 threes or 270, with 20 remaining. Add this 20 to one already there. Then ask: 'How many threes in 21?' which gives the answer 7.
- Reduce this further. Discuss with your child how the 29 represents 290. Ask 'How many threes 290?' 90 threes are in 270 so we have 20 left. This can be represented by a 2 (for 2 tens). This now becomes 21. 'How many threes in 21?' The answer is 7. Altogether we have 97 threes in 291.

$$291 \div 3 = 97$$



Children need to be really secure with multiplication tables and place value for this method.

Long division (using chunking)

- The next step is to tackle a 3 digit number divided by a 2 digit number.
- Ask your child what ten lots of 24 is. This is 240. 'Could we get 20 lots of 24 from 560?' This is 480, so we could.
- Subtract the 480 from 560 and keep a record at the side of how many lots of 24 you have subtracted.
- 'This leaves us 80. How many 24s are in 80?'
- 3 x 24 = 72 (again record this at the side).
- Subtract the 72 which leaves you with 8 which becomes the remainder. Therefore the answer is 23 remainder 8.

$560 \div 24 = 23$ r 8

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      23 r 8
   ┌──────
24 │ 560
   - 480    (20 x 24)
   ─────
     80
   -  72    (3 x 24)
   ─────
      8
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