

# ÷ Advanced Division at Firbeck Academy

## Step 5: 'Bus Stop' or 'Bus Shelter' long division.

This method works well for solving large division problems, e.g. HTU ÷ TU and ThHTU ÷ TU.

- Draw the 'Bus Shelter.' Put the number being divided (the dividend) inside the 'Bus Shelter', with the dividing number (the divisor) outside to the left, in this case  $432 \div 15$ .
- Now I work from left to right to find the 'goes intos', e.g. "How many 15s go into 4?" Put the answer above the 'Bus Shelter' (in this case it's 0, so we continue and ask, "How many 15s go into 43?" because any remainders are carried onto the next number to make it into a two-digit number). It may be useful to make some jottings at the side; in this case, the 15 times table. This shows that there are 2 15s in 43, which make 30, so I write 2 above the 'Bus Shelter' as the next part of the answer.
- Now subtract the 30 from 43, using the Column Method of subtraction - this gives me 13 which I write underneath (see example).
- Now I bring down the remaining 2 from inside the 'Bus Shelter' to make the number 132 (see example).
- "How many 15s go into 132?" I continue making jottings at the side to help me work this out, writing down the 15 times table.  $8 \times 15 = 120$ , so I write 8 above the 'Bus Shelter' as the next part of the answer.
- Now I subtract the 120 from 132, again using the Column Method of subtraction - this gives me 12 which I write underneath (see example).
- "How many 15s go into 12?" I can't solve this, and I have no more digits left to bring down, so 12 becomes the remainder. The answer is  $28r12$ .

Handwritten examples of long division on a grid background.

(a)  $15 \overline{)432}$

(b)  $15 \overline{)432}$  with 0 written above the 4, and 2 above the 3. A red arrow points from the 2 to the 15s table jottings.

Jottings to help with 15x table

(c)  $15 \overline{)432}$  with 2 written above the 3, and 30 written below 43. A red arrow points from the 30 to the 15s table jottings.

Jottings to help with 15x table

(d)  $15 \overline{)432}$  with 28 written above 32, and 120 written below 132. A red arrow points from the 120 to the 15s table jottings.

Jottings to help with 15x table

(e)  $15 \overline{)432}$  with 28 written above 32, and 120 written below 132. A red arrow points from the 120 to the 15s table jottings.

Jottings to help with 15x table

(f)  $15 \overline{)432}$  with 28 written above 32, and 120 written below 132. A red arrow points from the 120 to the 15s table jottings.

Jottings to help with 15x table

(g)  $15 \overline{)432}$  with 28 written above 32, and 120 written below 132. A red arrow points from the 120 to the 15s table jottings.

Jottings to help with 15x table

## Dividing decimals

There are two strategies we teach at Firbeck to divide decimals using **Written Methods ('Bus Stop') of Short and Long Division.**

**(1) Adjustment.** First, you need

to adjust the decimal number so that it is a whole number, e.g. if it has 1 decimal place, multiply the number mentally by 10, if it has 2 decimal places, multiply by 100 etc. Then solve the problem as usual, but remember to adjust the answer back by dividing by the relevant number, e.g. if your original number had 1 decimal place, remember to divide the answer by 10 (making it 10 times smaller).

**(2) Long Division** (see example, right). The decimal point is left in the dividend and brought directly upwards into the answer. The remainder (if present) can be worked out to any number of decimal places by adding extra 0s as place holders and bringing them down until the divisor has been exactly divided.

Handwritten example of long division for a decimal on a grid background.

$15 \overline{)43.20}$  with 2.88 written above the line. A red arrow points from the 0 to the text "Add extra 0s as place holders and bring down".

Add extra 0s as place holders and bring down