

## Long Division with Remainders

When we are given a long division to do it will not always work out to a whole number. Sometimes there will be numbers left over. These are known as remainders. Taking an example similar to that on the [Long Division](#) page it becomes more clear.

$$435 \div 25$$

If you feel happy with the process on the long division page you can [skip](#) the first bit.

$\begin{array}{r} 25 \overline{)435} \end{array}$	$4 \div 25 = 0 \text{ remainder } 4$	The first number of the dividend is divided by the divisor.
$\begin{array}{r} 0 \\ 25 \overline{)435} \end{array}$		The whole number result is placed at the top. Any remainders are ignored at this point.
$\begin{array}{r} 0 \\ 25 \overline{)435} \\ \underline{0} \end{array}$	$25 \times 0 = 0$	The answer from the first operation is multiplied by the divisor. The result is placed under the number divided into.
$\begin{array}{r} 0 \\ 25 \overline{)435} \\ \underline{0} \\ 4 \end{array}$	$4 - 0 = 4$	Now we <b>take away</b> the bottom number from the top number.
$\begin{array}{r} 0 \\ 25 \overline{)435} \\ \underline{0} \downarrow \\ 43 \end{array}$		Bring down the next number of the dividend.
$\begin{array}{r} 0 \\ 25 \overline{)435} \\ \underline{0} \downarrow \\ 43 \end{array}$	$43 \div 25 = 1 \text{ remainder } 18$	Divide this number by the divisor.

$\begin{array}{r} 01 \\ 25 \overline{)435} \\ \underline{0\downarrow} \\ 43 \end{array}$		The whole number result is placed at the top. Any remainders are ignored at this point.
$\begin{array}{r} 01 \\ 25 \overline{)435} \\ \underline{0\downarrow} \\ 43 \\ \underline{25} \end{array}$	$25 \times 1 = 25$	The answer from the above operation is multiplied by the divisor. The result is placed under the last number divided into.
$\begin{array}{r} 01 \\ 25 \overline{)435} \\ \underline{0\downarrow} \\ 43 \\ \underline{25} \\ 18 \end{array}$	$43 - 25 = 18$	Now we <b>take away</b> the bottom number from the top number.
$\begin{array}{r} 01 \\ 25 \overline{)435} \\ \underline{0\downarrow} \\ 43 \\ \underline{25} \\ 185 \end{array}$		Bring down the next number of the dividend.
$\begin{array}{r} 01 \\ 25 \overline{)435} \\ \underline{0\downarrow} \\ 43 \\ \underline{25} \\ 185 \end{array}$	$185 \div 25 = 7 \text{ remainder } 8$	Divide this number by the divisor.

$  \begin{array}{r}  017 \\  25 \overline{) 435} \\  \underline{0} \downarrow \\  43 \\  \underline{25} \downarrow \\  185  \end{array}  $		The whole number result is placed at the top. Any remainders are ignored at this point.
$  \begin{array}{r}  017 \\  25 \overline{) 435} \\  \underline{0} \downarrow \\  43 \\  \underline{25} \downarrow \\  185 \\  175 \\  \hline  \end{array}  $	$25 \times 7 = 175$	The answer from the above operation is multiplied by the divisor. The result is placed under the number divided into.
$  \begin{array}{r}  017 \\  25 \overline{) 435} \\  \underline{0} \downarrow \\  43 \\  \underline{25} \downarrow \\  185 \\  175 \\  \hline  010  \end{array}  $	$185 - 175 = 10$	Now we <b>take away</b> the bottom number from the top number.
		There is still 10 left over but no more numbers to bring down.
$  \begin{array}{r}  017 \text{ r } 10 \\  25 \overline{) 435} \\  \underline{0} \downarrow \\  43 \\  \underline{25} \downarrow \\  185 \\  175 \\  \hline  010  \end{array}  $		With a long division with remainders the answer is expressed as 17 remainder 10 as shown in the diagram