



DIVISION

Division is ...

... splitting into equal parts or groups. It is the result of "fair sharing".

Division has its own special words to remember.

- Let's take the simple problem of dividing 22 by 5. The answer is 4, with 2 left over. Here we illustrate the important words:

Which is the same as:

A diagram of a long division problem: $5 \overline{)22} 4 R 2$. Red arrows point from labels to parts of the equation: "Quotient" points to the 4, "Divisor" points to the 5, "Remainder" points to the R 2, and "Dividend" points to the 22.

Which is the same as:

A diagram of a division equation: $22 \div 5 = 4 R 2$. Red arrows point from labels to parts of the equation: "Quotient" points to the 4, "Dividend" points to the 22, "Divisor" points to the 5, and "Remainder" points to the R 2.

Objective:

To use the division algorithm to divide without a remainder

$$4 \overline{)312}$$

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To divide, first find the place of the first digit of the quotient.

$$4 \overline{)312}$$

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Are there enough hundreds?

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$4 > 3$ There are not enough hundreds.

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Are there enough tens?

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Objective:

To use the division algorithm to divide without a remainder

Are there enough tens?

$$4 \overline{)312}$$

$4 < 31$ There are enough tens.

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$$4 \overline{)312}$$

The quotient will begin in the tens place.

Objective:

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$$4 \overline{)312}^x$$

The quotient will begin in the tens place.

Objective:

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Now, find the first digit of the quotient.

$$4 \overline{)312}$$

Objective:

To use the division algorithm to divide without a remainder

Use basic multiplication facts to determine the first digit.

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Use basic multiplication facts to determine the first digit.

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Which basic fact with **4** as a factor has a product close to **31**, but not greater than **31**?

$$4 \overline{)312}$$

Objective:

To use the division algorithm to divide without a remainder

Which basic fact with **4** as a factor has a product close to **31**, but not greater than **31**?

$$4 \overline{)312}$$

$$4 \times 7 = 28 \rightarrow 28 \text{ is close to } 31$$

$$4 \times 8 = 32 \rightarrow 32 \text{ is greater than } 31$$

Objective:

To use the division algorithm to divide without a remainder

The first digit in the quotient is 7.
Write 7 in the tens place.

$$\begin{array}{r} 7 \\ 4 \overline{)312} \end{array}$$

Multiply:
 $4 \times 7 = 28$

Objective:

To use the division algorithm to divide without a remainder

$$\begin{array}{r} 7 \\ 4 \overline{) 312} \\ \underline{- 28} \\ 3 \end{array}$$

Subtract:
 $31 - 28 = 3$

Objective:

To use the division algorithm to divide without a remainder

$$\begin{array}{r} 7 \\ 4 \overline{) 312} \\ \underline{- 28} \\ 32 \end{array}$$

Bring down the
2 and make the
number 32.

Objective:

To use the division algorithm to divide without a remainder

Use basic multiplication facts to determine the next digit in the quotient.

$$\begin{array}{r} 7 \\ 4 \overline{)312} \\ \underline{-28} \\ 32 \end{array}$$

Which basic fact with **4** as a factor has a product close to **32**, but not greater than **32**?

Objective:

To use the division algorithm to divide without a remainder

$$4 \times 8 = 32 \rightarrow 32 \text{ equals } 32$$

$$\begin{array}{r} 7 \\ 4 \overline{)312} \\ \underline{-28} \\ 32 \end{array}$$

Which basic fact with **4** as a factor has a product close to **32**, but not greater than **32**?

Objective:

To use the division algorithm to divide without a remainder

So, the next digit in the quotient is 8. Write 8 in the ones place.

$$\begin{array}{r} 78 \\ 4 \overline{)312} \\ \underline{-28} \\ 32 \\ \underline{32} \\ 0 \end{array}$$

Multiply:
 $4 \times 8 = 32$

Objective:

To use the division algorithm to divide without a remainder

$$\begin{array}{r} 78 \\ 4 \overline{)312} \\ \underline{-28} \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

Subtract:

$$32 - 32 = 0$$

Objective:

To use the division algorithm to divide without a remainder

$$\begin{array}{r} 78 \\ 4 \overline{)312} \\ \underline{-28} \\ 32 \\ \underline{-32} \\ 0 \end{array}$$

The remainder is 0.
So, $312 \div 4 = 78$.



*Dividing a 4-digit by 2-digit
numbers*

- Place the divisor before the division bracket and place the dividend (4138) under it.

$$17)4138$$

- Examine the first digit of the dividend(4). It is smaller than 17 so can't be divided by 17 to produce a whole number. Next take the first two digits of the dividend (41) and determine how many 17's it contains. In this case 41 holds two seventeens ($2 \times 17 = 34$) but not three ($3 \times 17 = 51$). Place the 2 above the division bracket.

$$\begin{array}{r} \underline{2} \\ 17)4138 \end{array}$$

- Multiply the 2 by 17 and place the result (34) below the 41 of the dividend.

$$\begin{array}{r} \underline{2} \\ 17 \overline{)4138} \\ \underline{34} \end{array}$$

- Draw a line under the 34 and subtract it from 41 ($41-34=7$). Bring down the 3 from the 4138 and place it to the right of the 7.

$$\begin{array}{r} \underline{2} \\ 17 \overline{)4138} \\ - \underline{34} \\ \hline 73 \end{array}$$

- Divide 73 by 17 and place that answer above the division bracket and to the right of the two.

$$\begin{array}{r} \underline{24} \\ 17)4138 \\ - \underline{34} \\ 73 \end{array}$$

- Multiply the 4 of the quotient by the divisor (17) to get 68 and place this below the 73 under the dividend. Subtract 68 from 73 to give an answer of 5. Bring down the 8 from the dividend 4138 and place it next to the 5

$$\begin{array}{r} \underline{24} \\ 17 \overline{)4138} \\ \underline{-34} \\ 73 \\ \underline{-68} \\ 58 \end{array}$$

- Divide 58 by 17 and place that answer (3) above the division bracket and to the right of the four.

$$\begin{array}{r} \underline{243} \\ 17 \overline{)4138} \\ \underline{-34} \\ 73 \\ \underline{-68} \\ 58 \end{array}$$

- Multiply the 3 of the quotient by the divisor (17) to get 51 and place this below the 58 under the dividend. Subtract 51 from 58 to give an answer of 7.

$$\begin{array}{r} \underline{243} \\ 17 \overline{)4138} \\ \underline{-34} \\ 73 \\ \underline{-68} \\ 58 \\ \underline{-51} \\ 7 \end{array}$$

- There are no more digits in the dividend to bring down so the 7 is a remainder. The final answer could be written in several ways.

243 remainder 7 or sometimes 243 r 7.



Taken from:

- <http://www.sadlier-oxford.com/math/reteach/gr4/ATM0405b.htm>
- http://www.mathsisfun.com/long_division2.html