

Adding and subtracting decimals

To add or subtract decimals, we must write the numbers one under the other with the decimal points lined up.

Example 1

Add 5.6 and 2.3.

$$\begin{array}{r} 5.6 \\ 2.3 + \\ \hline 7.9 \end{array}$$

When we want to add or subtract two decimals that have a different number of digits after the decimal point, we can add in zeros after the last digit to make the numbers the same length. This is acceptable because adding zeros to the end of decimals does not change the value of the number.

For example, 5.30 is the same as 5.3 and 7.4300 is the same as 7.43.

Example 3

Add 4.17 and 5.4.

Here, we will write 5.4 as 5.40 before adding.

$$\begin{array}{r} 4.17 \\ 5.40 + \\ \hline 9.57 \end{array}$$

Example 2

Subtract 4.6 from 8.9.

$$\begin{array}{r} 8.9 \\ 4.6 - \\ \hline 4.3 \end{array}$$

Example 4

Subtract 4.23 from 9.5.

Here, we will write 9.5 as 9.50 before subtracting.

$$\begin{array}{r} 9.50 \\ 4.23 - \\ \hline 5.27 \end{array}$$

Dividing a decimal by a whole number

Dividing a decimal by a whole number is very similar to dividing by whole numbers.

A common way of doing this is to use the 'bus stop' method.

We must be careful to keep the decimal points lined up as it is very easy to make a mistake with place values.

Example 1

Divide 0.8 by 4.

$$\begin{array}{r} 0.2 \\ 4 \overline{) 0.8} \\ \underline{0.8} \\ 0 \end{array}$$

Example 2

Divide 1.725 by 5.

$$\begin{array}{r} 0.345 \\ 5 \overline{) 1.725} \\ \underline{5.0} \\ 2.2 \\ \underline{17.5} \\ 25 \\ \underline{25} \\ 0 \end{array}$$

Dividing by a decimal

When dividing by a decimal, a common method is to first multiply both numbers by the same amount to make the number we are dividing by a whole number. This makes the calculation a lot easier to carry out, but it does not change the answer as we are multiplying both numbers in the calculation by the same amount.

For example, to calculate $8 \div 0.2$, we can either:

multiply both numbers by 10 to get $80 \div 2$ – this gives us an answer of 40

or

multiply both numbers by 5 to get $40 \div 1$ – this also gives us an answer of 40.

Many who use this method typically multiply both numbers by 10, 100, etc. depending on the number of decimal places in the number we are dividing by. However, as shown above, you can sometimes multiply both numbers in the calculation by another number and still get the same answer.

Multiplying a number with one decimal place by 10 will always make it into a whole number. However, multiplying a number with two decimal places by 10 will not make it into a whole number, so instead we can multiply it by 100.

A number with three decimal places would need to be multiplied by 1000 to make it into a whole number.

Example 1

$4 \div 0.5$

Multiplying both numbers by 10 gives the following:

$$40 \div 5 = 8$$

Example 3

$6 \div 0.15$

Multiplying both numbers by 100 gives the following:

$$600 \div 15 = 40$$

Example 2

$0.8 \div 0.2$

Multiplying both numbers by 10 gives the following:

$$8 \div 2 = 4$$

Example 4

$1.8 \div 0.02$

Multiplying both numbers by 100 gives the following:

$$180 \div 2 = 90$$

Check that you can:

- add, subtract, multiply and divide whole numbers
- recognise decimal numbers
- use the column method (or suitable alternative non-calculator method) for addition and subtraction
- use the 'bus stop' method (or suitable alternative non-calculator method) for division
- remember your times tables.

Multiplying decimals

To multiply decimals:

- First, multiply the numbers as if there is no decimal point in the numbers.
- Next, count the total number of digits after the decimal point in each number.
- Finally, place the decimal point so that there is the same number of digits after the decimal point in the answer as there was in the calculation.

Example 1 0.4×1.3

Total number of digits after the decimal point: $1 + 1 = 2$

$$4 \times 13 = 52$$

$$\text{Answer: } 0.4 \times 1.3 = 0.52$$

Example 2 0.42×0.6

Total number of digits after the decimal point: $2 + 1 = 3$

$$42 \times 6 = 252$$

$$\text{Answer: } 0.42 \times 0.6 = 0.252$$

REMEMBER! A lot of the same skills you use for performing the four operations on whole numbers will also apply when working with decimal numbers.