‘How To’ Guide – One Number as a % of Another Number

Percentages: A proportion based on the number 100. Its symbol is %.

We can use percentages to compare quantities that are presented in different formats; e.g. decimals, fractions and ratios.
Converting one number into a % of another is an excellent way to compare fractions of different denominators.

Example 1

Change $\frac{19}{35}$ into a percentage.

1	9	÷	3	5	=

×	1	0	0	=

19 ÷ 35 x 100 = 54.29%

Example 2

Change $\frac{4}{5}$ into a percentage.

$$\frac{4}{5} \times \frac{20}{20} = \frac{80}{100}$$

Since the denominator is 100 we can interpret this as a percentage. In this case 80%

Example 3

Change $\frac{3}{8}$ into a percentage.

Since eight is not a factor of 100 we need to use a different denominator. In this case 200 would work.

$$\frac{3}{8} \times \frac{25}{25} = \frac{75}{200}$$

$$\frac{75}{200} = \frac{37.5}{100}$$

Therefore the answer is 37.5%

How we teach it

- It is important to realise that there are two distinct approaches to this topic.
- Method 1: With a calculator
- Method 2: Without a calculator.

Method 1: **Calculator allowed**

- Set your two numbers out as a fraction with a numerator (the first number) and a denominator (the second number).
- Divide the numerator by the denominator then multiply the answer by 100.

Method 2: **No Calculator allowed**

- Set your two numbers out as a fraction with a numerator (the first number) and a denominator (the second number).
- Convert the fraction into another with a denominator of 100 (if possible).
- Use the basic principles of equivalent fractions to do this (perform the same operation to the numerator as you do to the denominator).
- Once you have the fraction over 100, the percentage is the value of the numerator. If 100 is not available, try for 200 then halve your numerator etc.

Additional info

- Not every calculation will result in a ‘neat and tidy’ answer
  Some will generate a decimal answer that recurs.
  This means the decimal part of the answer will continue forever (with a repeating pattern).
  Such examples are when the denominator is 3 (or a multiple of 3) or 7 (or a multiple of 7)
- In this case it is normal practice to round the decimal to an appropriate degree of accuracy. (2 decimal places will usually suffice)

  E.g. $\frac{1}{6} = 16.67\%$

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Common mistakes

- Leaving the calculator answer as a decimal – forgetting to multiply by 100.
- Not understanding that you can have more than 100%.
- Using an incorrect multiplier to generate a denominator of 100.
- Forgetting to perform the same operation to the numerator as you do to the denominator, resulting in an answer too small.
- Poor multiplication/numeracy skills .
- Panicking and rejecting an answer when the decimal recurs (in the case of a multiple of 3) and when the decimal looks nasty (in the case of a multiple of 7).
- Not knowing what multiplier to use in the case of a non-calculator question.

What can you do to help?

- Whenever you set a piece of work that can be marked numerically, write the mark as a fraction.
- Ask the students to convert the fractional grade into a percentage.
- If the denominator allows, use the non-calculator method. If not, use the calculator method.