

Guidance for tutors

The table below outlines useful information for tutors as well as some suggested approaches and resources.

Outcome	NR1	Student can consistently:	Divide an amount into a given ratio and find the whole, given a part.
How the topic is examined	<ul style="list-style-type: none"> • Examined through test paper questions. • Questions are equally likely to appear on calculator or non-calculator papers. Therefore, students should be exposed to problems that require not using a calculator. • Students are usually given the ratio in number form (e.g. 3 : 5), however very occasionally students will need to bring the ratio out of the questions. 		
Prior knowledge	<ul style="list-style-type: none"> • Students should be confident: <ul style="list-style-type: none"> o Multiplying and dividing without a calculator. o Finding a fraction of an amount (NF2). o Using a calculator. • In addition questions involving ratio can have links to: <ul style="list-style-type: none"> o Fractions (NF1, NF2). o Percentages (NR1 – NR3). 		

<p>Suggested tuition approaches</p>	<ul style="list-style-type: none"> • Ensure students understand what ratio means (e.g. for every 2 of this, it is 3 of this). • Students should understand the difference between a part and the whole. • Students should cover all possible examples: <ul style="list-style-type: none"> ◦ Where they have to share an amount into a given ratio. (e.g. divide £120 into the ratio 3 : 1) ◦ Where they are given a particular part and have to find the total or the other part. (e.g. the ratio of cows to sheep in a field is 2 : 5. There are 35 sheep, how many cows are there in the field?) ◦ Where they are given comparison information to work out part of the whole. (e.g. the ratio of A : B is 4 : 7. B is 15 more than A, find the total of A and B) • Ensure that student identify whether they have been given the total or a particular part at the start of the question. • It is important that students work with ratios with more than two parts (e.g. 4 : 5 : 1) • Most students find it easier to understand ratio problems using a visual method. The 'bags' method or bar modelling are the most common. • The steps involved are: <ul style="list-style-type: none"> ◦ Drawing the correct number of bags or bars for the ratio (e.g. 3 : 5). This will allow them to find the total number of parts if they need to. ◦ Divide the quantity given by the total number of bags/parts (or the particular number of parts) ◦ Understand that each bag/part contains the same amount (e.g. each part is equal) ◦ Work out the missing part or whole as required by multiplying.
<p>Common errors and misconceptions</p>	<ul style="list-style-type: none"> • The most common misconception is that students simply add up the total number of parts even if they have NOT been given the total. It tends to be the default approach that many students take. • Students struggle with the link to fractions with ratios. • Visual approaches to ratio help students avoid these misconceptions.

Suggested resources

- Bar modelling for ratio problems
 - o http://www.thinkingblocks.com/thinkingblocks_ratios/tb_ratio_main.html (explanation & activity)
 - o http://www.hmhc.com/~media/sites/home/education/global/pdf/white-papers/mathematics/elementary/math-in-focus/mif_model_drawing_lr.pdf?la=en (page 5)
- Questions
 - o <http://www.cimt.org.uk/projects/mepres/allgcse/bkc15.pdf> (pp 162-165, pp174 - 176)
 - o <http://maths.gahs.org.uk/files/2014/05/Ratio.pdf>
- Khan Academy Videos
 - o <https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-ratios-prop-topic>
- Past GCSE Questions
 - o <http://www.castleschool.co.uk/ratio2.pdf>