

Outcome	NR2	Student can consistently:	Solve problems involving proportion.
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. • Questions are most likely to be presented in the form of currency exchange problems, best buy problems, scale problems or recipe problems. 		
Prior knowledge	<ul style="list-style-type: none"> • Students should be confident: <ul style="list-style-type: none"> ◦ Multiplying and dividing without a calculator. ◦ Finding a fraction of an amount (NF2). ◦ Using a calculator. • In addition questions involving ratio can have links to: <ul style="list-style-type: none"> ◦ Fractions (NF1, NF2). ◦ Percentages (NR1 – NR3). ◦ Conversion graphs. 		
Suggested tuition approaches	<ul style="list-style-type: none"> • Simple proportion problems are quite rare, however the unitary method to solve the problems can be used - such as finding the cost of one by dividing and then multiplying. (e.g. Tom buys 24 identical calculators. The total cost is £480 Work out the total cost of 31 of these calculators.) • It is more likely that students will meet currency exchange problems, best buy problems or recipe problems. Although the unitary method can always be used, often on non-calculator questions it is easier to find other factors. • The table below shows the different types of questions and the suggested approaches. • Sometimes for the currency exchange problems, the exchange rate may be given as a conversion graph. 		

	<table><tr><th>Currency exchange</th><th>Best Buy/Best Value</th><th>Recipe</th></tr><tr><td><p>£1 = \$1.78</p><p>How many £s would you get for \$480?</p></td><td><p>300g of cereal cost £1.65 440g of cereal cost £2.00</p><p>Which is the better value?</p></td><td><p>Makes 8 cookies</p><p>240g sugar 350g flour 100g butter 2 eggs</p><p>How much sugar is needed to make 12 cookies?</p></td></tr><tr><td><ul style="list-style-type: none">• These problems require using the currency rate and either multiplying or dividing.• Encourage students to think about whether they should get “more” or “less” of the new currency.</td><td><ul style="list-style-type: none">• The easiest way is to use the unitary method to work out how much one ‘thing’ costs. (in this case 1g)• Whichever value is smaller is the better value.• An alternative approach is to work out how many/much you got for £1 and then compare.</td><td><ul style="list-style-type: none">• Encourage students to look for factors.• (E.g. here you need 4 more cookies, which is a half of 8). So you will need $240 + 120 = 360$g of sugar.• Students could work out how much one costs and then multiply, however there is more room for error.</td></tr></table>	Currency exchange	Best Buy/Best Value	Recipe	<p>£1 = \$1.78</p> <p>How many £s would you get for \$480?</p>	<p>300g of cereal cost £1.65 440g of cereal cost £2.00</p> <p>Which is the better value?</p>	<p>Makes 8 cookies</p> <p>240g sugar 350g flour 100g butter 2 eggs</p> <p>How much sugar is needed to make 12 cookies?</p>	<ul style="list-style-type: none">• These problems require using the currency rate and either multiplying or dividing.• Encourage students to think about whether they should get “more” or “less” of the new currency.	<ul style="list-style-type: none">• The easiest way is to use the unitary method to work out how much one ‘thing’ costs. (in this case 1g)• Whichever value is smaller is the better value.• An alternative approach is to work out how many/much you got for £1 and then compare.	<ul style="list-style-type: none">• Encourage students to look for factors.• (E.g. here you need 4 more cookies, which is a half of 8). So you will need $240 + 120 = 360$g of sugar.• Students could work out how much one costs and then multiply, however there is more room for error.
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Common errors and misconceptions	<ul style="list-style-type: none">• For the currency exchange problems the most common error is that students divide instead of multiplying and vice-versa. Encourage students to think about whether they should get “more” or “less” of the new currency.• For the best value problems, students compare wrongly. They are often unsure what their answer represents after they have divided thus making the wrong decision. Encourage students to think about what they have just worked out and label their answers.• It is easy to lose the final mark on the best value problem by forgetting to say which is the best value, even though the student has all the correct calculations.• For the recipe problems students struggle to realise what fraction increase they are trying to find and when they do they often just find that fraction and forget to add it on to the original amount.									
Suggested resources	<ul style="list-style-type: none">• Questions<ul style="list-style-type: none">o http://www.cimt.org.uk/projects/mepres/allgcse/bkc15.pdf (pp 166-174)o https://www.tes.co.uk/teaching-resource/gcse-practice-exam-questions--ratio-and-proportion-11016102 (free login is required))• Past GCSE Questions<ul style="list-style-type: none">o https://keshgcsemaths.files.wordpress.com/2013/11/26_best-buys2.pdfo https://keshgcsemaths.files.wordpress.com/2013/11/29_proportion_ingredients2.pdfo https://keshgcsemaths.files.wordpress.com/2013/11/31_exchange-rates2.pdf									