Outcome	NF3	Student can consistently:	Round numbers to any given number of decimal places and significant figures.
How the topic is examined			● Examined through test paper questions. ● This question can appear on calculator or non-calculator papers. ● Over the course of the papers there will be one question that requires students to round an answer to a given degree of accuracy (e.g. 2 decimal places). In addition there will be several other questions that require students to round an answer to a sensible/suitable degree of accuracy. ● Students will then need to round accurately all other answers on the examination papers.

Prior knowledge			● Students should be confident:
			   o Rounding to the nearest 10, 100, 1000 etc…
			● In addition questions involving rounding can have links to:
			   o Upper and lower bound problems (NF8)

Suggested tuition approaches			● Based on how this topic is assessed you should be able to see that confidence in rounding to a given number of decimal places or significant figures are essential to success in mathematics. ● In general if a question asks students to round to a suitable/sensible degree of accuracy they should always round to 3 significant figures. ● Indeed it is good practice in all the work that students do to encourage them to round to 3 s.f. as this prepares them well for A-level mathematics.

Decimal places (d.p.)	Significant figures (s.f.)
• When a question asks to round to a certain number of decimal places then this should be the number of numbers that are after the decimal point in your answer. • Like with any rounding you need to look at the number to the right hand side of the required degree of accuracy. If the number is a 5 or more then the number before needs to increase by 1. **Example** 14.89187 to 1 d.p. is 14.9 14.89187 to 2 d.p. is 14.89 14.89187 to 3 d.p. is 14.892	• When a question asks to round to a certain number of significant figures then this should be the number of numbers that are in your answer after rounding. • Leading zeroes do not count as being significant. • Like with any rounding you need to look at the number to the right hand side of the required degree of accuracy. If the number is a 5 or more then the number before needs to increase by 1. **Example** 14.89187 to 1 s.f. is 10 (1 number in your answer, the zero is needed to give the number its size (e.g. ten)) 14.89187 to 2 s.f. is 15 (2 numbers in your answer) 14.89187 to 3 s.f. is 14.9 (3 numbers in your answer)

• Money problems should always be rounded to 2 decimal places. It is the exception to the 3 significant figures rule.

Common errors and misconceptions

• Students truncate (cut it short) an answer rather than round. A common mistake is students get the right number of decimal places or significant figures, but they just truncate it and don't look at the number after.
• Students make mistakes when asked to round a number like 14.9999. If this was rounded to 1 d.p. the answer is 15.0 and 2.d.p it is 15.00. Some students forget to put the 0's saying that it doesn't affect the number. This is wrong and students should always write the required number of decimal places after the decimal point even if they are zeros.
• The same applies to rounding to a required number of significant figures too.
• Students round prematurely. In some questions that require numerous steps students round intermediate answers too early and this leads to accuracy errors in subsequent calculations. Encourage students to write down all intermediate answers to **at least** 6 decimal places and only round their final answer to a more sensible degree of accuracy.
• When dealing with money, answers like £12.6 don't make any sense. Students often put this as their calculator says 12.6. Ask them to think about how we write money.

Suggested resources	- Questions - http://www.cimt.org.uk/projects/mepres/allgcse/bka6.pdf (pp 221 – 224) - https://corbettmaths.files.wordpress.com/2013/02/rounding-pdf.pdf - https://corbettmaths.files.wordpress.com/2013/02/significant-figures-pdf.pdf - Past GCSE Questions - Tested throughout. - Video tutorial - http://corbettmaths.com/2013/09/07/rounding-to-1-or-2-decimal-places/ - http://corbettmaths.com/2013/09/07/rounding-significant-figures/