Outcome	AEq4		Student can consistently:	Write down integer solutions for an inequality and represent the solution on a number line.
How the topic is examined	• Examined through test paper questions. • Questions are equally likely to appear on calculator or non-calculator papers. • Questions will ask students to "Write down all the integer solutions …" for a given inequality. • Students can then be asked to represent this or a different inequality on a number line. The question would ask students to "Represent this inequality on the number line …."			
Prior knowledge	• Students should be confident with: o Solving basic inequalities (AEq3) o Negative numbers.			
Suggested tuition approaches	• These questions are relatively straight forward if students understand the general principles of inequalities. • There are four types of inequality symbol that students could meet. They are > (greater than), < (less than), ≥ (greater than or equals) and ≤ (less than or equals). 1) Write down all the integer solutions. o Students need to understand that the word integer means whole number. o Because it would be impossible to write down all the integer solutions to inequalities such as < 3, questions will ask for ones within two bounds such as $-5 < \leq 2$ o It is almost always the case that one of the inequalities will be strictly (<) and one of them will be less than or equal (≤) o Students should be encouraged to think about this as "Write down all the whole numbers between -5 and 2, it cannot equal -5, but it can equal 2 (because of the equal part of the inequality)" o One mark is deducted for each number emission. o Very occasionally a question might look like this $-3.7 < < 4.8$. The same rules apply and you are still looking for whole number solutions. o Sometimes you may have to manipulate the inequality first (e.g. $-6 \leq 2 < 10$ or $-3 < 3 - 1 < 10$). If this is the case then you need to get it so the single letter remains in the middle. Solve it like you would an inequality (See AEx3 for an example like this)			

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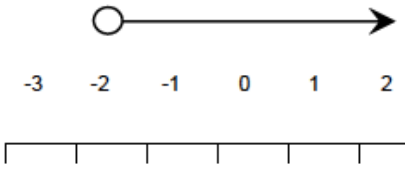
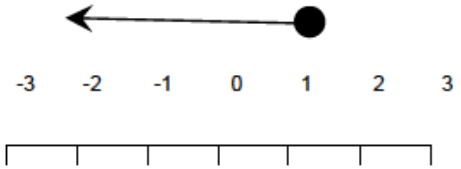
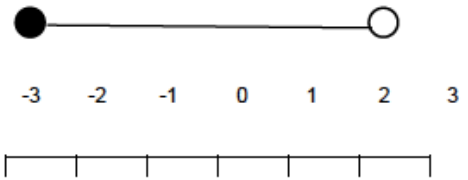
2) Representing this on a number line.

o The question could ask students to represent an inequality on a number line. o

Strictly less than (<), greater than (>)	Less/greater than or equal to (≤)(≥)	Within limits.
Represent $x > -2$ on a number line. Draw a number line say from -3 to 3 (one may be given) Put an open circle at -2 and draw an arrow going upwards.  We put an open circle to show it cannot equal this value.	Represent $x \leq 1$ on a number line. Draw a number line say from -3 to 3 (one may be given) Put a closed/shaded in circle at 1 and draw an arrow going downwards.  We put a closed circle to show it can also equal this value.	Represent $-3 \leq x < 2$ on a number line. Draw a number line say from -3 to 3 (one may be given) Put a closed/shaded in circle at -3 and an open circle at 2. Draw a straight line between these two circles. 

- Questions could ask students to write down the inequality represented by a particular number line. This would simply be the opposite of the above work.

Common errors and misconceptions

- It is easy to miss out values and lose marks. Double check your answer. 0 is a common number that is missed out by students.
- When an inequality is given like $-6 \leq 2x < 10$ students don't divide both numbers by 2 first.
- It is easy to confuse the open and closed circles and what they mean.

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Suggested resources	

	• Questions
	  o http://www.cimt.org.uk/projects/mepres/allgcse/bkc16.pdf (pp 197 - 200)
	  o https://corbettmaths.files.wordpress.com/2013/02/inequalities-pdf.pdf
	• Video tutorials
	  o http://corbettmaths.com/2013/05/18/inequalities-on-a-number-line/
	  o http://corbettmaths.com/2013/05/18/inequalities/
	• Past GCSE Questions
	  o https://keshgcsemaths.files.wordpress.com/2013/11/61_algebra_inequalities.pdf

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