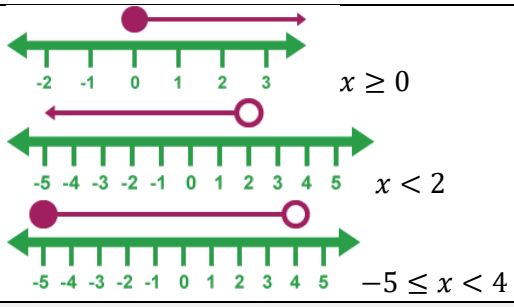
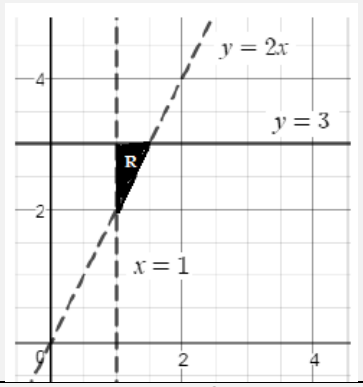
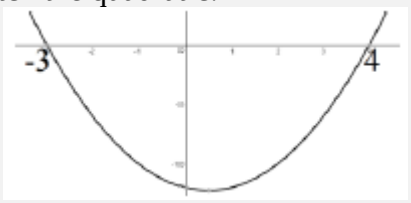
STM Knowledge Organiser Year: 11 Subject: Maths

Topic: Inequalities

Core Knowledge

Topic/Skill	Definition/Tips	Example
1. Inequality	An inequality says that two values are **not equal**. $a \neq b$ means that a is not equal to b.	$7 \neq 3$ $x \neq 0$
2. Inequality symbols	$x > 2$ means **x is greater than 2** $x < 3$ means **x is less than 3** $x \geq 1$ means **x is greater than or equal to 1** $x \leq 6$ means **x is less than or equal to 6**	State the integers that satisfy $-2 < x \leq 4$. -1, 0, 1, 2, 3, 4
3. Inequalities on a Number Line	Inequalities can be shown on a number line. **Open circles** are used for numbers that are **less than or greater than** ($< or >$) **Closed circles** are used for numbers that are **less than or equal or greater than or equal** ($\leq or \geq$)	
4. Graphical Inequalities	Inequalities can be represented on a coordinate grid. If the inequality is **strict** ($x > 2$) then use a **dotted line**. If the inequality is **not strict** ($x \leq 6$) then use a **solid line**. **Shade** the **region** which satisfies all the inequalities.	Shade the region that satisfies: $y > 2x, x > 1 \; and \; y \leq 3$ 
5. Quadratic Inequalities	**Sketch the quadratic graph** of the inequality. If the expression is $>$ ***or*** $\geq$ then the answer will be **above the x-axis**. Shade this part on the graph. If the expression is $<$ ***or*** $\leq$ then the answer will be **below the x-axis**.Shade this part on the graph. The reason why it is important to shade is so that the region you want is clearly identified. Look carefully at the inequality symbol in the question.	Solve the inequality $x^2 - x - 12 < 0$ Sketch the quadratic:  The required region is below the x-axis, so the final answer is: $-3 < x < 4$ If the question had been > 0, the answer would have been: $x < -3 \; or \; x > 4$

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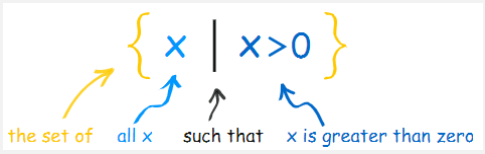
	Look carefully if the quadratic is a **positive or negative parabola**.	
6. Set Notation	A **set** is a **collection of things**, usually numbers, denoted with brackets { } $\{x \mid x \geq 7\}$ means 'the set of all x's, such that x is greater than or equal to 7' The 'x' can be replaced by any letter. Some people use ':' instead of '|'	$\{3, 6, 9\}$ is a set.  $\{x : -2 \leq x < 5\}$

Links to graphs, solving equations,