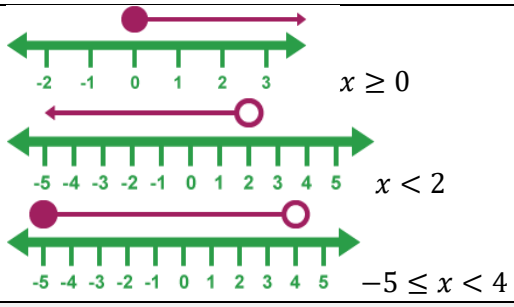
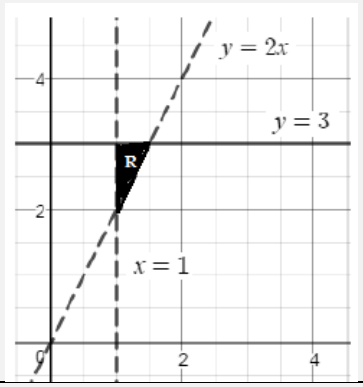
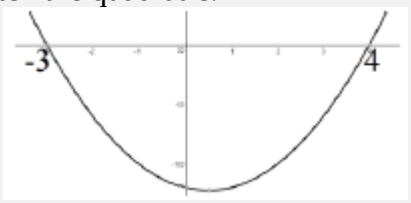
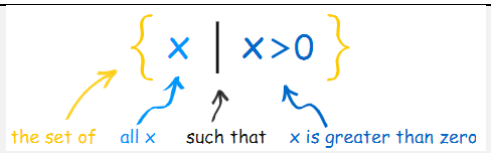
Topic: Inequalities

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	$\boldsymbol{x > 2}$ means **x is greater than 2** $\boldsymbol{x < 3}$ means **x is less than 3** $\boldsymbol{x \geq 1}$ means **x is greater than or equal to 1** $\boldsymbol{x \leq 6}$ 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**. If the expression is $<$ ***or*** $\leq$ then the answer will be **below the x-axis**. Look carefully at the inequality symbol in the question. Look carefully if the quadratic is a **positive or negative parabola**.	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: $x < -3 \; or \; x > 4$
6. Set Notation	A **set** is a **collection of things**, usually numbers, denoted with brackets { }	$\{3, 6, 9\}$ is a set.

	$\{x \mid x \geq 7\}$ 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 '|'	 $\{x : -2 \leq x < 5\}$