Topic: Inequalities

| Topic/Skill | Definition/Tips | Example |
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| 1. Inequality | An inequality says that two values are not equal. <br> $a \neq b$ means that a is not equal to b . | $\begin{aligned} & 7 \neq 3 \\ & x \neq 0 \end{aligned}$ |
| 2. Inequality symbols | $\begin{aligned} & x>2 \text { means } x \text { is greater than } 2 \\ & x<3 \text { means } x \text { is less than } 3 \\ & x \geq 1 \text { means } x \text { is greater than or equal to } \\ & 1 \\ & x \leq 6 \text { means } x \text { is less than or equal to } 6 \\ & \hline \end{aligned}$ | State the integers that satisfy $\begin{gathered} -2<x \leq 4 \\ -1,0,1,2,3,4 \end{gathered}$ |
| 3. Inequalities on a Number Line | Inequalities can be shown on a number line. <br> Open circles are used for numbers that are less than or greater than ( $<$ or $\rangle$ ) <br> 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. <br> If the inequality is strict $(x>2)$ then use a dotted line. <br> If the inequality is not strict $(x \leq 6)$ then use a solid line. <br> Shade the region which satisfies all the inequalities. | Shade the region that satisfies: $y>2 x, x>1 \text { and } y \leq 3$  |
| 5. Quadratic Inequalities | Sketch the quadratic graph of the inequality. <br> If the expression is $>\boldsymbol{o r} \geq$ then the answer will be above the $\mathbf{x}$-axis. <br> If the expression is $<\boldsymbol{o r} \leq$ then the answer will be below the $\mathbf{x}$-axis. <br> Look carefully at the inequality symbol in the question. <br> Look carefully if the quadratic is a positive or negative parabola. | Solve the inequality $x^{2}-x-12<0$ <br> Sketch the quadratic: <br> The required region is below the x -axis, so the final answer is: $-3<x<4$ <br> If the question had been $>0$, the answer would have been: $x<-3 \text { or } x>4$ |
| 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 <br> that x is greater than or equal to 7' <br> The ' $x$ ' can be replaced by any letter. <br> Some people use ' $:$ ' instead of ' $\mid '$ |
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