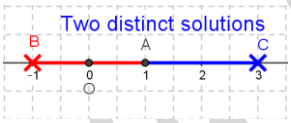
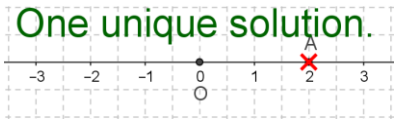
➢ Equations:

Solving simple equations of the form: $|ax+b|=k$ where $a,b\&k\in\mathbb{R}$ depnds on the sign of ***k***

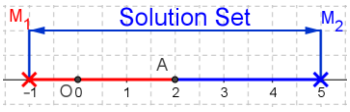
	Cases	Case-1	Case-2	Case-3
Condition:	If	$k>0$	$k<0$	$k=0$
Expected strategies	Then: $\|ax+b\|=k$	Is equivalent to $ax+b=+k$ or $ax+b=-k$	Admits ***no*** solution	Admits ***one*** and only one solution
	Example	$\|x-1\|=2$ Is equivalent to $x-1=2$ or $x-1=-2$ That is, it admits two real solutions.	$\|5x+3\|=-4$ Admits no solution.	$\|2x-4\|=0$ Is equivalent to: $2x-4=0$ That is, it admits one unique solutions.
Graphical view			Distance can never be negative	

Tactics: *Always remember to isolate the absolute value on the left side*

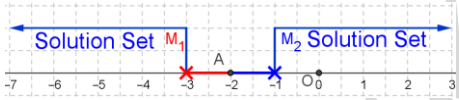
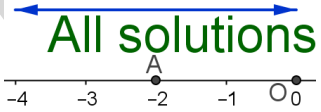
➢ Inequalities:

Solving simple inequalities of the form: $|ax+b|<k$ and $|ax+b|>k$ where $a,b\&k\in\mathbb{R}$ depends on the **sign of** k

Form-1

		Cases	Case-1	Case-2	Case-3
Condition:		If	$k>0$	$k<0$	$k=0$
Expected strategies	Less than	Then: $\|ax+b\|<k$	Is equivalent to $-k<ax+b<+k$	Admits ***no*** solution	Admits ***no*** solution
		Example	$\|x-2\|<3$ Is equivalent to $-3<x-2<3$ Or we write $x-2<3$ **and** $x-2>-3$	$\|x-2\|<-1$ Admits no solution	$\|x+1\|<0$ Admits no solution
Graphical view				Distance can never be negative	Distance can never be negative

Form-2

	Cases	Case-1	Case-2	Case-3
Condition:	If	$k>0$	$k<0$	$k=0$
Expected strategies — Greater than	Then $\lvert ax+b\rvert>k$	Is equivalent to $ax+b>+k$ **or** $ax+b<-k$	Is always true	Is forever verified
	Example	$\lvert x+2\rvert>1$ Is equivalent to $x+2>1$ *or* $x+2<-1$	$\lvert x+2\rvert>-1$ Admits all real solution	$\lvert x+2\rvert>0$ Admits all real solution
Graphical view				

Tactics: *Always remember to isolate the absolute value on the left side*

Tactics: Any inequality of the form:

- $\lvert ax+b\rvert\le k$ *mean that:* $\begin{cases} Either: \lvert ax+b\rvert<k \\ Or: \lvert ax+b\rvert=k \end{cases}$
- $\lvert ax+b\rvert\ge k$ *mean that:* $\begin{cases} Either: \lvert ax+b\rvert>k \\ Or: \lvert ax+b\rvert=k \end{cases}$

➢ Special form:

Solving simple equations of the form: $\lvert ax+b\rvert=\lvert cx+d\rvert$ where $a,b,c\ \&\ d\in\mathbb{R}$ is similar to $\lvert ax+b\rvert=k$ where $k>0$.

Example: Solve $\lvert -x+2\rvert=\lvert 3x-5\rvert$

Is equivalent to: $\begin{cases} Either: -x+2=3x-5 \\ Or: -x+2=-(3x-5) \end{cases}$

Tactics: Remember to:

- *Check for existance of solution.*
- *Write solution set every time.*

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