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Absolute Values and Inequalities using TI-Calculator

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Name: _____ **Date:** _____

To **check** the values of an **absolute value equation** or **inequality** using your TI-83+ or TI-84+ calculator, follow these steps:

1. Isolate the absolute value (get the |……| by itself).
2. Whatever is on the left of the =, <, >, ≤, or ≥, goes into Y_1 on your calculator.
   a. If it is an absolute value expression (has |……|), this is entered into your calculator by pressing ` 0 (which is ≠) and the first function is abs(which stands for absolute value. Place whatever is in between the |……| exactly as you see it and close the parentheses))
3. Whatever is on the right of the =, <, >, ≥, or ≤ goes in Y_2 on your calculator.
4. Press # 6 to see if you can see where the graphs intersect.
   a. If an equality:
      i. If you can see the intersections, then you can determine the *x*-values where the equation is solved (è ulate them!)
      ii. If you cannot see the intersections, change your @ until you can, then see Step i. above.
   b. If an inequality:
      i. If they are asking for < or ≤, you are looking for values **below** the horizontal line and you will be using an **and** (____ < *x* < ____)
      ii. If they are asking for > or ≥, you are looking for values **above** the horizontal line and you will be using an **or** (*x* < ____ or *x* > ____)

Example 1:

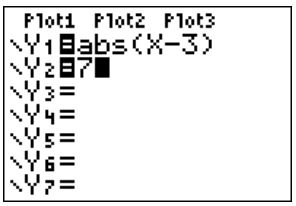
Solve $|x-3|-2=5$.

❶ Get |*x* – 3| by itself:

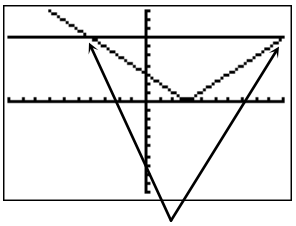
$|x-3|=7$

Put |*x* – 3| in Y_1:

Put 7 in Y_2:

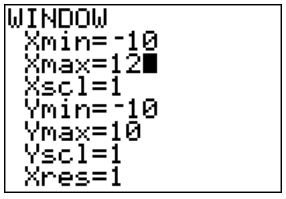


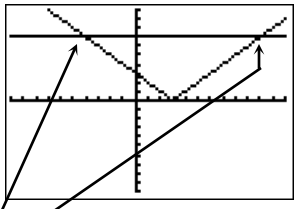
❷ Press # 6

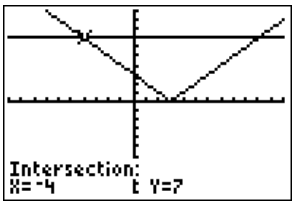


You can see where the graphs intersect, but let's change the @ to see them better.

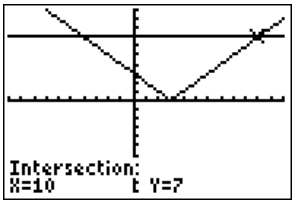
❸ Set Xmax = 12 and press % .







❹ You can see where the graphs 5: intersect better now. Find the values using è ($). The values are *x* = ____ **and** *x* = ____.



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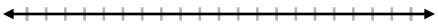
Graph the solution of $|x-3|=5$:



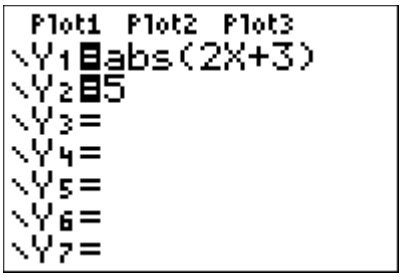
Example 2:

Solve: $3|2x+3|-1\le 14$

❶ Remember, *isolate* the |……| first!

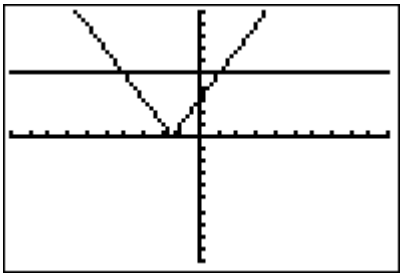
$|2x + 3| \le 5$

❷ Enter the left hand side into Y_1 and the right hand side into Y_2:



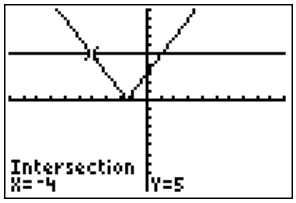
❷

❸ Press % :



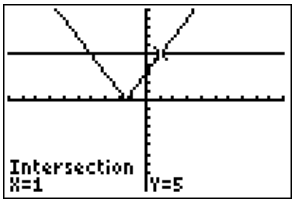
❸

Only y-*values less than or equal to* 5 *are being sought*! These are indicated as those **under** the horizontal line*! Find where the graphs 5: intersect:



For what values of *x* is the graph of the absolute value (the "V"-shaped graph) **below the horizontal line**?*
Between _____ and _____. Our solution then is:

_____ $\le x \le$ _____ and the graph:



*Conversely, if asked $|2x + 3| > 5$, we would look for the values of *x* when the absolute value graph is **above the horizontal line**.

Practice:

Solve and graph the solution set of:

a. $|x+2|=3$ b. $4|2x-1|>8$ c. $|1-x|<5$